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TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

No. 187.

MRS. PETER DUFF, ROBERT DUFF, EDWARD A. KITZMILLER, AND THE UNION MANUFACTURING COMPANY, APPELLANTS,

vs.

THE STERLING PUMP COMPANY.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT OF ILLINOIS.

FILED FEBRUARY 23, 1880.

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1 Pleas in the circuit court of the United States for the northern district of Illinois, held at the United States court-rooms, in the city of Chicago, in the district aforesaid, before the judges thereof, on Saturday, the tenth day of November, in the year of our Lord one thousand eight hundred and seventy-seven, and of our Independence the one hundred and second year.

WILLIAM H. BRADLEY, *Clerk.*

MRS. PETER DUFF, EDWARD A. KITZMILLER, Robert P. Duff, and The Union Manufacturing Company, of Toledo, Ohio,
v.
THE STERLING PUMP COMPANY. } In chancery.

NORTHERN DISTRICT OF ILLINOIS, *sct:*

Be it remembered that on the 12th day of May, A. D. 1876, came the said complainants, by Messrs. West and Bond, their solicitors, and filed in the office of the clerk of the circuit court of the United States for the northern district of Illinois, at Chicago, in the district aforesaid, their bond for costs and bill of complaint in said entitled cause, which said bond for costs and bill of complaint are respectively in the words and figures following, to wit:

2 *Bond for costs.*

UNITED STATES OF AMERICA,
Northern District of Illinois, ss:

Circuit court, May term, A. D. 1876.

MRS. PETER DUFF, EDWARD A. KITZMILLER, Robert P. Duff, and The Union Manufacturing Company
v.
THE STERLING PUMP COMPANY. } In chancery.

I enter myself security for costs in this cause, and promise to pay all costs which may accrue to the opposite party in this action, or to any of the officers of this court; and in default of payment by the plaintiffs of any costs ordered or adjudged to be paid by them, I hereby agree and stipulate that execution may issue against my property for any costs taxed against them.

Dated this twelfth day of May, A. D. 1876.

LESTER L. BOND.

(Endorsed:) Filed May 12th, A. D. 1876. Wm. H. Bradley, clerk.

Bill of complaint.

In the United States circuit court in and for the northern district of Illinois. In equity.

To the honorable the judges of the circuit court of the United States in and for the northern district of Illinois, in chancery sitting:

3 Mrs. Peter Duff, Edward A. Kitzmiller, and Robert P. Duff,

all residents of State of Pennsylvania, and citizens of said State of Pennsylvania, and the Union Manufacturing Company of Toledo, Ohio, citizens of the State of Ohio, duly incorporated under and by virtue of the laws of said State of Ohio, bring this their bill of complaint against the Sterling Pump Company, citizens of the State of Illinois, duly incorporated under and by virtue of the laws of said State of Illinois.

And thereupon your orators complain and say that before the seventh day of February, eighteen hundred and seventy-one, one Westley Todd was the true, original, and first inventor of a certain new and useful improvement in wash-boards not known and used by others before his said invention thereof, and which had not at the time of his application for a patent therefor been in public use or on sale with his consent or allowance for a period of two years, as your orator verily believe.

And your orators further show unto your honors that the said Westley Todd, so being the inventor of said improvement, and being a citizen of the United States aforesaid, made application to the proper department of the Government of the United States for letters patent therefor, in accordance with the then existing laws of Congress, and he having duly complied in all respects with the conditions and requisitions of said laws such proceedings were had that, on the seventh day of February,
4 eighteen hundred and seventy-one, letters patent of the United States for the said improvement and invention, under the seal of the Patent Office of the United States, signed by the Secretary of the Interior and countersigned by the Commissioner of Patents, and bearing date the day and year last aforesaid, were issued in due form of law and delivered to him, the said Westley Todd, whereby was granted and secured to him and his heirs, executors, administrators, or assigns for the term of seventeen years from the day of the date thereof the full and exclusive right of making, using, and vending to others to be used the said improvement and invention, a description whereof is given in the words of the said inventor in a schedule in writing, accompanied by drawings and references thereto duly annexed to said letters patent when the same were issued and made a part thereof, as by the said original letters patent or a duly authenticated copy thereof in court to be produced will fully appear.

Your orators further show unto your honors that subsequently and prior to the fifth day of October, A. D. 1875, by virtue of, and under and through certain instruments in writing, executed and delivered by the proper parties, and duly recorded in the Patent Office of the United States, the said Mrs. Peter Duff, Edward A. Kitzmiller, and Robert P. Duff became the sole owners of the said letters patent No. 111585, and all rights thereunder, and since the date last aforesaid your orator,
5 The Union Manufacturing Company, has had an exclusive license for making, using, and vending to others to be used the improvement and invention described in the aforesaid letters patent for, to, and in the whole of the United States.

And your orators further show unto your honors that afterwards the said Westley Todd, by and with the consent of the said Mrs. Peter Duff, Edward A. Kitzmiller, and Robert P. Duff, for good and lawful cause, surrendered said last-mentioned original letters patent No. 111585 to the Commissioners of Patents, and duly made application for a new patent to

be issued for the same invention, and accompanied such application with a corrected description and specification, and with the requisite drawings, and in all respects complied with the acts of Congress in such case made and provided; whereupon, on the fifth day of October, eighteen hundred and seventy-five, new letters patent for the same invention last mentioned were, in accordance with law, duly granted, issued, and delivered to the said Mrs. Peter Duff, Edward A. Kitzmiller, and Robert P. Duff, by the names of Mrs. P. Duff, E. A. Kitzmiller, and R. P. Duff, assignees as aforesaid, for the residue of said term of seventeen years; that said last-mentioned letters patent were duly issued in accordance with and in due form of law, under the seal of the Patent Office of the United States, signed by the Acting Secretary of the Interior, and countersigned
6 by the Commissioner of Patents, and bear date the day and year last aforesaid, and were designated as reissue No. 6673, and that there was by said reissued letters patent secured to them, said Mrs. Peter Duff, Edward A. Kitzmiller, and Robert P. Duff, their heirs and assigns, for the term of seventeen years from the seventh day of February, eighteen hundred and seventy-one, the full and exclusive right of making, using, and vending to others to be used the said original improvement and invention described and claimed in said reissue No. 6673; that a legal corrected description and specification of said original improvement and invention contained in said reissued letters patent is given in the words of the said Westley Todd in a certain schedule accompanied by drawings and written references thereto, which was in due form of law annexed to said reissued letters patent at the time the same were issued, and made a part thereof, as by the said last-mentioned original reissued letters patent, or a duly authenticated copy thereof to be produced as the court shall direct will fully appear; a copy of which, without the drawings, is hereto annexed, forming part of this bill, marked Exhibit A.

And your orators further show unto your honors that the said improvement and invention patented as aforesaid has hitherto been in the exclusive possession of the inventor, or his assignees or licensees, and
7 has hitherto been and still is of great value and profit to your orators, and has been extensively introduced into practical use, and has proved valuable to the public, and but for the infringement hereinafter complained of your orators would now be in the undisturbed possession and enjoyment of the exclusive privileges secured by said reissued letters patent No. 6673.

Yet the said defendant, as your orators are informed and believe, well knowing the premises, but contriving to injure your orators, and without their consent or allowance, and without right, and in violation of your orators' said rights, have, within said State of Illinois, and within said northern district of Illinois, and during the term of said reissued letters patent No. 6673, made, used, and vended, and is still making, using, and vending to others to be used, large numbers of wash-boards, but how many your orators cannot state, but pray that the defendant may discover and set forth the number, containing substantially the improvement and invention of a material and substantial part thereof set forth and patented in and by said reissued letters patent No. 6673, and thereby the said defendant has infringed, and still does infringe, and your orators fear that in future it will infringe, upon the exclusive rights and privileges secured to your orators as aforesaid.

And your orators say that they have sustained damages by reason of said infringement in a large sum.

8 To the end, therefore, that the said defendant may, if it can, show why your orators should not have the relief herein prayed, and may, but not on oath, answer on oath being hereby expressly waived, and according to the best of its knowledge, remembrance, information, and belief, full, true, direct, and perfect answer make to all and singular the premises, and that it may be decreed to account for and pay over to your orators all gains and profits realized by it from the unlawful making, using, or vending the improvement vested in your orators as aforesaid, and the damages which your orators have sustained thereby; and that the defendant may be perpetually restrained by an injunction to be issued out of this honorable court from making, using, or vending any wash-boards containing the improvement and invention secured as aforesaid to your orators, or any material part thereof; and that your orators may have such other or further relief as equity may require.

May it please your honors to grant unto your orators not only a writ of injunction conformable to the prayer of this bill, but also a writ of subpœna directed to the defendant, The Sterling Pump Company, and commanding it, at a certain time and under a certain penalty, to appear before your honors in this court, then and there to answer unto this bill of complaint, and to abide by and perform such decree as the court may make in the premises; and your orators will ever pray, &c.

MRS. PETER DUFF.
EDWARD A. KITZMILLER.
9 ROBERT P. DUFF.
THE UNION MANUFACTURING COMPANY,
By WEST AND BOND, *their Att'ys.*

WEST and BOND,
Solicitors, and of Counsel for Complainants.

EXHIBIT A.

Westley Todd, of Ottopee, Ohio, assigner by mesne assignments to Mrs. P. Duff, E. A. Kitzmiller, and R. P. Duff, of Wilkins Township, Allegheny County, Pennsylvania. Improvement in wash-boards. Specification forming part of letters patent No. 111585, dated February 7, 1871; reissue No. 6674, dated October 5, 1875; application filed September 7, 1875.

To all whom it may concern:

Be it known that I, Westley Todd, late of the city and county of Allegheny, and State of Pennsylvania, but now of Ottokee, Fulton County, Ohio, have invented a new and useful improvement in wash-boards, and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

The nature of my invention consists in the construction of a sheet-metal wash-board with a rubbing face longitudinally and transversely corrugated or ribbed, whereby such rubbing surface shall be made up of a series of projections bounded by a series of horizontal, vertical, and

10 angularly shaped grooves. The rubbing face somewhat resembles the face of a rasp or file in general appearance, though the projections are less sharp and angular.

To enable others skilled in the art to make and use my invention, I will proceed to describe more fully its construction.

In the accompanying drawing, which forms part of my specification, Figure 1 represents a front elevation of my improvement in wash-boards; Fig. 2 is a vertical section of the same.

In the accompanying drawing A represents the frame of the wash-board and is of ordinary construction. The rubbing surface is formed of sheet zinc or other suitable sheet metal, corrugated or provided with a series of raised portions, B, alternating along the line of the corrugation or rib which forms them, with depressions or unraised portions, *a*; the corrugations and depressions extending in either direction across the sheet, so that a series of horizontal and vertical, and also angularly shaped grooves are formed between the projections. Each projection, B, represents four inclined surfaces sloping from the apex of the projection into the grooves which surround and bound it. The grooves between the corrugations are also broken or interrupted at intervals by small projections or raised portions C, each of which presents two lateral surfaces.

In a wash-board thus longitudinally and transversely ribbed or
11 corrugated the inequalities of the rubbing surfaces are such that the desired effect is more readily and effectively attained, whereby the labor of washing is greatly diminished, and is accomplished with ease and facility and with less than the usual wear on the clothes.

I claim herein as my invention:

1. A sheet metal wash-board having a series of raised projections, B, each bounded by longitudinal and transverse grooves or depressions, substantially as set forth.

2. In a sheet metal wash-board the projections B, each bounded by grooves or depressions in combination with raised projections C, in the bottoms of the interlying grooves, substantially as set forth.

3. As a new article of manufacture a sheet metal wash-board having a rubbing face both longitudinally and transversely ribbed or corrugated, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WESTLY TODD.

Witnesses:
ED. A. KITZMILLER.
J. S. RIDDLE.

(Endorsed:) Filed May 12, 1876. Wm. H. Bradley, cl'k.

And on the same day, to wit, the 12th day of May, A. D. 1876, a writ of subpœna issued out of said clerk's office to said defendant in said en-
12 titled cause, which said writ with the return of the marshal endorsed thereon, is in the words and figures following, to wit:

Writ of subpœna.

UNITED STATES OF AMERICA,
Northern District of Illinois, ss:

The United States of America to The Sterling Pump Company, greeting:

We command you and every of you that you appear before our judges of our circuit court of the United States of America for the northern district of Illinois, at Chicago, in said district, on the first Monday in the month of June next, to answer the bill of complaint of Mrs. Peter Duff, Edward A. Kitzmiller, Robert P. Duff, and The Union Manufacturing Company, of Toledo, Ohio, this day filed in the clerk's office of said court in said city of Chicago, then and there to receive and abide by such judgment and decree as shall then or thereafter be made, upon pain of judgment being pronounced against you by default.

To the marshal of the northern district of Illinois to execute.

Witness the Hon. Morrison R. Waite, Chief Justice of the Supreme Court of the United States of America, at Chicago, aforesaid, this 12th day of May, in the year of our Lord one thousand eight hundred and seventy-six, and of our Independence the 100th.

[SEAL.] WM. H. BRADLEY, *Clerk.*

13 MEMORANDUM.—The above-named defendants are notified that unless they and each of them shall enter their appearance in the clerk's office of said court, at Chicago aforesaid, on or before the day to which the above writ is returnable, the complainant's bill will be taken against them as confessed, and a decree entered accordingly.

WM. H. BRADLEY, *Clerk.*

Service of this writ by marshal waived, and due service thereof is hereby acknowledged.

Sterling, Ills., May 15th, A. D. 1876.

STERLING PUMP COMPANY,
By A. J. HULL, *Tre's.*

(Endorsed:) Filed May 29th, A. D. 1876. Wm. H. Bradley, clerk.

Afterwards, to wit, on the 13th day of November, A. D. 1876, said defendant, by its solicitor, filed in said clerk's office its answer in said entitled cause, which said answer is in the words and figures following, to wit:

Answer.

UNITED STATES OF AMERICA,
Northern District of Illinois, ss:

In the circuit court of the United States.

MRS. PETER DUFF ET AL.
v.
THE STERLING PUMP COMPANY. } In equity.

The answer of The Sterling Pump Company, defendant in the above-

14 entitled cause, to the bill of complaint of Mrs. Peter Duff, Edward A. Kitzmiller, Robert P. Duff, and The Union Manufacturing Company, complainants therein.

This defendant, saving and reserving unto itself all and all manner of benefit and exception which can and may be taken to the many uncertainties and insufficiencies in the said bill of complaint contained, for answer thereto, or to such parts and portions thereof as this defendant is advised it is necessary or material for it to make answer to, answering by Aaron J. Hull, its president, says:

That as to whether the said Westley Todd, before the seventh day of February, 1871, or at any other time, became or was the true, original, or first inventor of any new and useful improvement in wash-boards, as by said bill of complaint is supposed, this defendant is ignorant, and therefore it denies the same.

And as to whether said Westley Todd, as the inventor of said supposed invention or otherwise, ever received letters patent of the United States for said supposed improvement, this defendant is ignorant, and calls for strict proof thereof.

And as to whether said Westley Todd, with the consent of said complainants or any of them or otherwise, surrendered said letters patent to the Commissioner of Patents, and received, on the fifth day of October, 1875, or at any other time, new letters patent for said supposed

15 improvement, or that such new letters patent were granted to the complainants or any of them on the day last aforesaid or at any time, or that the full and exclusive right of making, using, and vending to others to be used the said supposed improvement was in the manner charged in said bill secured to said complainants, this defendant is ignorant, and calls for strict proof of all of the same.

And that as to whether the said complainants, by assignment or otherwise, have become or are, as charged in said bill, the owners of all right, title, and interest in and to said letters patent and said supposed invention as by said bill is claimed, this defendant is ignorant, and it therefore denies the same.

And this defendant, further answering, denies that the said Westley Todd, or the said complainants or any of them, have ever been or are now in the exclusive possession of the said supposed improvement or invention charged to have been patented as aforesaid. And this defendant, further answering, denies that said Westley Todd was the original or first inventor of the said improvements in wash-boards, claimed in said bill of complaint.

But on the contrary, this defendant expressly charges the truth to be that long prior to the said supposed invention of said improvement by said Westley Todd, substantially the same thing was shown and de-

16 scribed in letters patent of the United States granted to William M. Galusha and Benjamin W. Safford, bearing date December 29th, 1857, No. 18965.

And also in letters patent of the United States granted to Ira S. Parker, bearing date January 15th, 1856, No. 14111.

And also in letters patent of the United States granted to Royal Hatch, bearing date April 8th, 1856, No. 14638.

And also in letters patent of the United States granted to Joseph K. O'Neil, bearing date January 18th, 1859, No. 22667.

And also in letters patent of the United States granted to Joseph Keech, bearing date April 10th, 1860, No. 27811; and also to same, bearing date October 16th, 1855, No. 13682.

And also in letters patent of the United States granted to Warren Hill, and bearing date August 6th, 1861, No. 32994.

And also in letters patent of the United States granted to George Whitford, and bearing date August 20th, 1861, No. 33118.

And also in letters patent of the United States granted to Joseph Hyde, and bearing date August 1, 1854, No. 11426.

And also in letters patent of the United States granted to S. S. Babbit, bearing date January seventh, 1862, No. 34046.

And also to John S. Lash, bearing date August 29th, 1865, No. 49635.

And also to Nelson Holmes, bearing date April 11th, 1865, No. 47206.

17 And also to Aylett R. Crichfield, bearing date June 4th, 1870, No. 108456.

And also to William Bellus and C. Bowers, bearing date September 7th, 1869, No. 94551.

And also A. P. Barlow, bearing date October 22d, 1861, No. 2507.

And also to Ashman Hall, dated July 28th, 1863, No. 39343.

And also to G. H. Kidney, dated September 30th, 1862, No. 36568.

And this defendant, further answering, denies that it or its officers or agents has or have at any time made, used, or vended any wash-boards containing, or which at any time contained, any of the said improvements claimed as aforesaid by complainants in their bill of complaint herein.

But on the contrary thereof this defendant avers the truth to be that all of the wash-boards of the manufacture or sale of which the complainants in their said bill of complaint complain were made and are now made under and in accordance with certain letters patent of the United States granted to Aaron J. Hull, and dated December 28th, 1875, and numbered 171568, which said last-named patent this defendant has the right to use, and this defendant avers that the wash-boards so as aforesaid made by this defendant are different in their construction from those claimed by said complainants to be secured to complainants by said letters patent

18 mentioned in said bill of complaint; and this defendant denies that the wash-boards made, used, or sold by defendant during the term of said reissued letters patent, or any of them, contained substantially the supposed improvements or invention or any material or substantial part thereof set forth and claimed in and by said reissued letters patent mentioned in complainant's said bill of complaint.

And this defendant denies all and all manner of unlawful combination and confederacy whereby it is by the said bill charged, without this that there is any other matter, cause, or thing in the complainant's said bill of complaint contained material or necessary for this defendant to make answer unto, and not herein and hereby well and sufficiently answered, confessed, traversed, and avoided or denied is true to the knowledge or belief of this defendant; all which matters and things this defendant is ready and willing to aver, maintain, and prove as this honorable court shall

direct, and prays to be hence dismissed with its reasonable costs and charges in this behalf most wrongfully sustained.

STERLING PUMP COMPANY,
By A. J. HULL, *President.*

JNO. G. MANAHAN,
Sol. for Defendant.

It is hereby stipulated by and in pursuance of previous verbal agreements between the counsel for the respective parties hereto that the
19 foregoing answer may be filed with the same force and effect as if filed in the proper time for filing, and no advantage shall be taken in consequence of its being filed of this date.

WEST AND BOND,
Sol'rs for Comp'ts.

Chicago, Ill's, November 13, 1876.

(Endorsed:) Filed Nov. 13, 1876. Wm. H. Bradley, cl'k.

And on the same day to wit, the 13th day of November, A. D. 1876, said complainant, by their solicitors, filed in said clerk's office their replication in said entitled cause; which said replication is in the words and figures following, to wit:

Replication.

United States circuit court, northern district of Illinois.

MRS. PETER DUFF ET AL.
v.
THE STERLING PUMP COMPANY.

The replication of Mrs. Peter Duff, Edward A. Kitzmiller, Robert P. Duff, and The Union Manufacturing Company, complainants, to the answer of The Sterling Pump Company, defendant.

These repliants, saving and reserving unto themselves now and at all times hereafter all and all manner of benefit and advantage of exception which may be had or taken to the manifold insufficiencies
20 of the said answer, for replication thereunto say that they will aver, maintain, and prove their said bill of complaint to be true, certain, and sufficient in law to be answered unto, and that the said answer of the said defendant is uncertain, untrue, and insufficient to be replied unto by these repliants; without this, that any other matter or thing whatsoever in said answer contained material or effectual in the law to be replied unto and not herein and hereby well and sufficiently replied unto, confessed and avoided, traversed or denied is true; all which matters and things these repliants are and will be ready to aver, maintain, and prove as this honorable court shall direct, and humbly pray as in and by their said bill they have already prayed.

WEST AND BOND,
Complainants' Solicitors.

(Endorsed:) Filed Nov. 13, 1876. Wm. H. Bradley, cl'k.

Afterwards, to wit, on the 10th day of April, A. D. 1877, said defendant, by its solicitors, filed in said clerk's office its amended answer in said entitled cause, which said amended answer is in the words and figures following, to wit:

Amended answer.

UNITED STATES OF AMERICA,
Northern District of Illinois, ss:

21 In the circuit court of the United States, of March term, 1877.

MRS. PETER DUFF ET AL.
v.
THE STERLING PUMP CO. } In equity.

The further answer (by way of amendment) of the Sterling Pump Company to the bill of complaint of the above-named complainants.

This defendant, further answering, says that the device or alleged invention described and claimed in said reissued letters patent No. 6673 of complainants is of no utility, and the wash-board therein described is practically no different, other, or more useful than the wash-boards well known and in general use in the United States years before the date of said alleged invention.

STERLING PUMP CO.,
By A. J. HULL, *Pres.*

We hereby stipulate that the foregoing may be filed in said cause as an amendment to the answer, without a formal order to that effect.

WEST AND BOND,
Sol'rs for Compl't.

(Endorsed:) Filed Apr. 10, 1877. Wm. H. Bradley, cl'k.

Afterwards, to wit, on the 9th day of October, A. D. 1877, in the
22 record of the proceedings of said court in said entitled cause, before the Hon. Henry W. Blodgett, district judge, is the following entry, to wit:

MRS. PETER DUFF ET AL.
v.
THE STERLING PUMP CO. } In chancery.

Now come the parties by their solicitors, and on motion this cause is set down for hearing upon the pleadings and proofs herein.

Afterwards, to wit, on the 10th day of November, A. D. 1877, in the record of the proceedings of said court in said entitled cause, before the Hon. Henry W. Blodgett, district judge, is the following entry, to wit:

MRS. PETER DUFF, EDWARD A. KITZMILLER, Robert P. Duff, and the Union Manufacturing Company of Toledo, Ohio,
vs.
THE STERLING PUMP COMPANY.
} In chancery.

The court having considered and being now fully advised upon the matters submitted upon the pleadings and proofs herein, finds the equities herein with the defendant, and dismisses the bill herein.

It is thereupon considered, adjudged, and decreed by the court that this cause be dismissed, and that the defendant do have and recover of
23 the complainants its costs and charges about its defence in this behalf expended, amounting to the sum of two hundred and sixty dollars and eighty-five cents, and that execution issue therefor.

And on the same day, to wit, the 10th day of November, A. D. 1877, the said complainants, by their solicitors, filed in said clerk's office their certificate of evidence in said entitled cause, which said certificate of evidence is in the words and figures following, to wit:

Certificate of evidence.

UNITED STATES OF AMERICA,
Northern District of Illinois:

Circuit court of the United States, northern district of Illinois.

MRS. PETER DUFF, EDWARD A. KITZMILLER, Robert P. Duff, The Union Manufacturing Company,
vs.
THE STERLING PUMP COMPANY.

Be it remembered, that heretofore, to wit, on the 10th day of November, A. D. 1877, on the hearing of the above-entitled cause, the complainants, to maintain the issues on their part, introduced and read in evidence the following documents and depositions, to wit:

Reissued letters patent granted to Mrs. P. Duff, E. A. Kitzmiller, and R. P. Duff, assignees of Wesley Todd, dated October 5th,
24 1875, No. 6673, for an improvement in wash-boards, marked Complainant's Exhibit A, O. W. B., *N. P.*

25 EXHIBIT A.—O. W. B., *N. P.*

The U. S. Patent Office to all persons to whom these presents shall come, greeting.

This is to certify that the annexed is a true copy from the records of this office, of the reissued letters patent granted Duff, Kitzmiller and Duff, dated October 5th, 1875, No. 6673, for imp't in wash-boards.

In testimony whereof I, W. H. Doolittle, acting Commissioner of Patents, have caused the seal of the Patent Office to be hereto affixed this twenty-third day of May, in the year of our Lord one thousand eight

hundred and seventy-six, and of the Independence of the United States the one hundredth.

[SEAL.]

W. H. DOOLITTLE,
Acting Commissioner.

No. 6673. Reissue.

The United States of America to all to whom these presents shall come:

Whereas Wesley Todd, of Ottokee, Ohio, assignor by mesne assignments to Mrs. P. Duff, E. A. Kitzmiller, and R. P. Duff, of Wilkins Township, Allegheny County, Pennsylvania, has presented to the Commissioner of Patents a petition praying for the grant of letters patent for an alleged new and useful improvement in wash-boards (for which letters patent were issued to him dated February 7, 1871, which letters having been surrendered the same have been canceled and new letters ordered
26 to issue to said assignees on an amended specification), a description of which invention is contained in the specification, of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and whereas, upon due examination made, the claimant is adjudged to be justly entitled to a patent under the law:

Now, therefore, these letters patent are to grant unto the said Duff, Kitzmiller and Duff, their heirs or assigns, for the term of seventeen years, from the seventh day of February, one thousand eight hundred and seventy-one the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the city of Washington, this fifth day of October, in the year of our Lord one thousand eight hundred and seventy-five, and of the Independence of the United States of America the one hundredth.

B. R. COWEN,
Acting Secretary of the Interior.

Countersigned.

[L. S.]

R. H. DUELL,
Commissioner of Patents.

(Here follows diagram marked page 27.)

27 UNITED STATES PATENT OFFICE.

Westly Todd, of Ottokee, Ohio, assignor by mesne assignments to Mrs. P. Duff, E. A. Kitzmiller, and R. P. Duff, of Wilkins Township, Allegheny County, Pennsylvania. Improvement in wash-boards. Specification forming part of letters patent No. 111585, dated February 7, 1871; reissue No. 6673, dated October 5, 1875. Application filed September 7, 1875.

To all whom it may concern:

Be it known that I, Westly Todd, late of the city and county of Allegheny and State of Pennsylvania, but now of Ottokee, Fulton County,

Ohio, have invented a new and useful improvement in wash-boards; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

The nature of my invention consists in the construction of a sheet-metal wash-board with a rubbing face longitudinally and transversely corrugated or ribbed, whereby such rubbing surface shall be made up of a series of projections, bounded by a series of horizontal, vertical, and angularly shaped grooves. The rubbing-face somewhat resembles the face of a rasp or file in general appearance, though the projections are less sharp and angular.

To enable others skilled in the art to make and use my inven-
28 tion, I will proceed to describe more fully its construction.

In the accompanying drawing, which forms part of my specification, Figure 1 represents a front elevation of my improvement in wash-boards. Fig. 2 is a vertical section of the same.

In the accompanying drawing A represents the frame of the wash-board, and is of ordinary construction. The rubbing surface is formed of sheet zinc or other suitable sheet metal, corrugated or provided with a series of raised portions, B, alternating along the line of the corrugation or rib which forms them, with depressions or unraised portions, *a*, the corrugations and depressions extending in either direction across the sheet, so that a series of horizontal and vertical and also angularly shaped grooves are formed between the projections. Each projection, B, represents four inclined surfaces sloping from the apex of the projection into the grooves which surround and bound it. The grooves between the corrugations are also broken or interrupted at intervals by small projections or raised portions, C, each of which presents two lateral surfaces.

In a wash-board thus longitudinally and transversely ribbed or corrugated the inequalities of the rubbing surfaces are such that the desired effect is more readily and effectively attained, whereby the labor of washing is greatly diminished and is accomplished with ease and facility, and with less than the usual wear on the clothes.

I claim herein as my invention—

29 1. A sheet-metal wash-board having a series of raised projections, B, each bounded by longitudinal and transverse grooves or depressions, substantially as set forth.

2. In a sheet-metal wash-board the projections, B, each bounded by grooves or depressions in combination with raised projections, C, in the bottoms of the interlying grooves, substantially as set forth.

3. As a new article of manufacture a sheet-metal wash-board, having a rubbing face both longitudinally and transversely ribbed or corrugated, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WESTLY TODD.

Witnesses:

ED. A. KITZMILLER.

J. S. RIDDLE.

(Endorsed:) Filed Oct. 9th, 1877. Wm. H. Bradley, clerk.

30 Original articles of agreement and license by and between P. Duff and Sons and The Union Manufacturing Company, of Toledo, Ohio, marked Complainant's Exhibit D, O. W. B., *N. P.*

31 EXHIBIT D.—O. W. B., *N. P.*

This agreement, made this 10th day of September, A. D. 1872, between Mrs. P. Duff, R. P. Duff, and E. A. Kitzmiller, partners doing business as P. Duff and Sons, of Pittsburgh, Pennsylvania, parties of the first part, and The Union Manufacturing Company, of Toledo, Ohio, parties of the second part, witnesseth:

Whereas the parties of the first part are owners of certain letters patent for improvement in wash-boards granted to Westly Todd, February 7th, 1871; and, whereas, the parties of the second part are desirous of manufacturing wash-boards containing said patented improvement; now, therefore, the said parties have agreed as follows:

1. The parties of the first part hereby license and empower the parties of the second part to manufacture, subject to the conditions hereinafter named, at their factory, in Toledo, Ohio, to the end of the term for which said letters patent were issued, wash-boards containing the patented improvement, and to sell the same within the following territory, to wit: All that territory of the United States included in a line starting at a point in boundary line between the United States and Canada directly north of the city of Buffalo, New York, running thence to Phila-
32 delphia, Pennsylvania; thence to Baltimore, Maryland; thence to Memphis, Tennessee; thence to Omaha, Nebraska; thence to Saint Paul, Minnesota; thence north to the Canada line; thence along said line to the place of beginning; including all of the cities named and all the territory embraced within said lines, with the exclusive right to manufacture and sell said wash-boards therein, excepting out of the said territory, however, the county of Allegheny, Pennsylvania, which is hereby reserved to the exclusive use of said parties of the first part.

2. The parties of the second part agree to make full and true returns to the parties of the first part, under oath, upon the first days of January, April, July, and October in each year of all wash-boards containing the patented improvement manufactured by them.

3. The parties of the second part agree to pay to the parties of the first part ten (10) cents as a license fee upon each and every dozen of wash-boards manufactured by said parties of the second part containing the patented improvement; provided that if the said fee be paid upon the days provided herein for quarterly payments and returns, or within thirty (30) days thereafter, a discount of fifty (50) per cent. shall be made from said fee for prompt payment.

33 4. Upon a failure of the parties of the second part to make returns or pay license fees on the days herein named, the parties of the first part may notify in writing the parties of the second part that the same are overdue; then if the returns are not made and license fees paid within thirty (30) days from the date of serving the said notice this agreement shall be terminated, but the parties of the second part shall not thereby be discharged from any liability to the parties of the first part for any license fees due at the time of the termination of this agreement.

5. The parties of the first part reserve at their option the privilege of

using patentee stamps to the party of the second part at the rate of five (5) cents per dozen, one of which stamps shall be affixed to each wash-board, providing the said parties of the first part shall deem it necessary for their protection, and the said parties of the second part hereby agree, in case such stamps are issued, to affix one of the same on each wash-board by them manufactured containing the patented improvements, and in default thereof to forfeit all rights and claims under this agreement at the option of said first parties.

6. Said parties of the second part further agree and bind themselves that they will not sell to any other than the parties of the first part the wash-boards manufactured by them (said parties of the second part) for sale within the county of Allegheny, Pennsylvania, during the existence of this agreement, and they will, at all times, to the best of their ability, on demand made, supply said first parties with wash-boards of their manufacture in kind and amount as required by them, and deliver the same at Pittsburgh, Pennsylvania, at such a cost to said first parties as to enable said first parties to successfully compete with others selling wash-boards in the same market, and to make a profit thereon amounting to at least five (5) per cent., provided that the parties of the second part shall not be required to deliver wash-boards to said first parties at a price less than cost of manufacturing, delivering, and a profit of at least five (5) per cent. to the manufacturer.

7. Said parties of the first part reserve to themselves the right to at once terminate this agreement upon the failure of the parties of the second part to comply with its terms, as also in case of their legal insolvency or bankruptcy, in which latter case it is agreed that the rights hereby conveyed to manufacture under said letters patent shall forthwith revest in said parties of the first part without any formal conveyance thereof.

8. The parties of the second part agree to make all reasonable exertion to manufacture and sell and to use all diligence in introducing said patented wash-board, and the parties of the first part likewise agree to make proper efforts, so long as they are engaged in their present business, to supply their market with wash-boards manufactured by the said second parties, in consideration of the exclusive right to sell, herein conveyed.

For the true and faithful performance of this agreement and all its provisions and covenants said parties hereto bind themselves, their and each of their heirs, executors, administrators, and assigns, firmly by these presents.

Witness our hands and seals the day and year aforesaid.

P. DUFF AND SONS. [SEAL.]
L. F. LYTTLE, *Sec'ty.* [SEAL.]

Witness' as to P. Duff and Sons—
W. McKOWN.
HENRY A. KITZMILLER.

Witness' as to Union Manufacturing Company, by L. F. Lyttle, secretary—
W. W. BOND.
S. B. WORDEN.

(Endorsed:) Filed Oct. 9, 1877. Wm. H. Bradley, clerk.

36 Deposition of Edward A. Kitzmiller, which is set out on page 97 of this transcript.

The defendant, to maintain the issues on its part, introduced and read in evidence the following documents and depositions, to wit:

Certified copy of letters patent of the United States granted to George Witsil et al., dated August 16th, A. D. 1864, No. 43887, for improvement in wash-board, marked Defendant's Exhibit 3, O. W. B., *N. P.*

37 DEFENDANT'S EXHIBIT 3.—O. W. B., *N. P.*

DEPARTMENT OF THE INTERIOR.

United States Patent-Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Witsil and Cresson, dated August 16th, 1864, No. 43887, for improved wash-board.

In testimony whereof I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this sixth day of April, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

The United States of America to all to whom these letters patent shall come:

Whereas George L. Witsil, of Philadelphia, Pennsylvania, has alleged that he has invented a new and useful improved wash-board (he having assigned his right, title, and interest in said invention to himself and Clement Cresson, of the same place), which he states has not been known or used before his application, has made oath that he is a citizen of
38 the United States; that he does verily believe that he is the original and first inventor or discoverer of the said invention, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said invention, and praying that a patent may be granted for that purpose:

These are, therefore, to grant according to law to the said Witsil & Cresson, their heirs, administrators or assigns, for the term of seventeen years, from the first day of August, one thousand eight hundred and sixty-four, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said invention, a description whereof is given in the words of the said George L. Witsil in the schedule hereto annexed, and is made part of these presents.

In testimony whereof I have cause these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this sixteenth day of August, in the year of our Lord one thousand eight hundred and sixty-

four, and of the Independence of the United States of America
39 the eighty-ninth.

J. P. USHER,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.
[SEAL.] D. P. HOLLOWAY,
Commissioner of Patents.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, G. L. Witsil, of Philadelphia, Pennsylvania, have invented a new and improved wash-board, and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention consists of a wash-board having concavities, annular recesses, and annular ribs, arranged substantially as and for the purpose described hereafter.

In order to enable others to make and use my invention I will now proceed to describe its construction and operation.

On reference to the accompanying drawing, which forms a part of this specification—

Fig. 1 is a face view of my improved wash-board, and

Fig. 2 a sectional view.

40 My improved wash-board consists of the outer frame A, within which is secured the board B, and in the face of the latter are formed small circular concavities *a*, around which are concave annular recesses *b*, and between the latter and the concavities intervene the annular ribs *d*.

As regards dimensions and external form my improved wash-board is similar to those of ordinary construction, the annular recesses and concavities, however, taking the place of the transverse corrugations of common wash-boards, and these recesses and concavities being arranged in respect to each other in the manner illustrated in Fig. 1.

When the saturated clothes are drawn from the wash-tub and placed against the face of the board the water and suds will find a lodgment in the concavities *a* and recesses *b*.

On rubbing the clothes over the face of the board they will partially enter the concavities and recesses, and bear against the outer edge of the said recesses and against the annular rib *d*.

The form of these edges and ribs and their arrangement in respect to each other have a tendency to cause the portion of the clothes pressed against the board to be acted on at all points, whereas the action of the rubbing edges presented by transverse corrugations is limited.

41 The presence of water in the concavities and recesses assists to force the dirt from the interstices of the fabric, and this water is displaced and a new supply of clean water deposited in the recesses every

time the saturated clothes are raised from the tub and placed against the board.

The annular concave recesses may be surrounded with others, thus presenting further edges for the clothes to be rubbed against. I have found in practice, however, that the concavities, recesses, and intervening ribs arranged as shown in the drawing are effective in practice.

I claim as my invention, and desire to secure by letters patent—

A wash-board having the concavities, annular recesses, and intervening ribs arranged substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. L. WITSILL.

Witnesses:
G. L. WITSILL,
CHARLES HONSON.

Ex'd, E. A. M., C. L.

(Endorsed:) Filed October 9th, 1877. Wm. H. Bradley, cl'k.

(Here follows diagram, marked page 42.)

42 Certified copy of letters patent of the United States granted to Joseph Keech, dated April 10th, 1860, No. 27811, for an improved wash-board, marked Defendant's Exhibit 5.—O. W. B., *N. P.*

43 DEFENDANT'S EXHIBIT 5.—O. W. B., *N. P.*

DEPARTMENT OF THE INTERIOR.

United States Patent Office, to all to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Joseph Keech, dated April 10th, 1860, No. 27811, for improved wash-board.

In testimony whereof I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this fourth day of April, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

The United States of America to all to whom these letters patent shall come:

Whereas Joseph Keech, of Waterloo, New York, has alleged that he has invented a new and useful improved wash-board, which he states has not been known or used before his application, has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said wash-board, and that the same hath not, to the best of his knowledge and belief, been

44 previously known or used; has paid into the Treasury of the United States the sum of thirty dollars and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said wash-board, and praying that a patent may be granted for that purpose.

These are therefore to grant, according to law, to the said Joseph Keech, his heirs, administrators, or assigns, for the term of fourteen years from the tenth day of April, one thousand eight hundred and sixty, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used the said wash-board, a description whereof is given in the words of the said Joseph Keech in the schedule hereto annexed and is made part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office has been hereunto affixed.

Given under my hand at the city of Washington this tenth day of April, in the year of our Lord one thousand eight hundred and sixty, and of the Independence of the United States of America the eighty-fourth.

JACOB THOMPSON,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.
[SEAL.] PHILIP F. THOMAS,
Commissioner of Patents.

45 The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Joseph Keech, of Waterloo, in the county of Seneca and State of New York, have invented a new and improved mode of constructing wash-boards; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings.

The nature of my invention consists in the peculiar form given to the corrugation or crimp of the rubbing-surface or zinc plate, they being formed into an obtuse angular shape longitudinally containing three angular points in the length of the crimp, which extends from side to side of the frame crosswise, the crimp being centrally advanced towards the upper end of the board and laterally receding or inclining towards the lower end, the two receding or downward angles being at a point equi-distant from the center of the plate to the stile or side of the board, the location of which is calculated to be the most direct spot where the hands would naturally move downward over the surface when in the act of washing.

The advantages claimed in this mode of crimping the rubbing
46 surface is that when the clothes are moved downward over the surface for the purpose of receiving the vibratory action necessary in removing the filth and stains from them, that there is not only a greater amount of friction produced with the same degree of labor, but there is also in addition an inward or side pressure, having a tendency to press or contract the portion of clothes confined beneath the hands as they come in contract with the lateral portion of the resisting side of the crimp first, and

bearing centrally until they are passed over the elevated part of the crimp, at which time the clothes are at liberty to spring back and take their natural position by the contraction of the fabric, thus causing a change of position of the clothes at the passage of each crimp, consequently a more rapid purifying of the article operated upon. This is the practical effect of the two outward angles over which the hands move. The center angle produces a similar effect, but produces an opposite movement of the clothes, as the central part of the crimp comes in contact first with the clothes, having an outward resistance until the article is passed over the elevated part of the crimp, then the clothes take their natural position as in the outside angles.

47 The accompanying drawing is a face view of a section in full width showing the upper end of the frame, and a part of the zinc plate.

To enable others skilled in the art to construct boards embracing my improvement, I would say that they can be made in either of the ordinary ways of making boards, either with the full thick back or with the thin back with round cross-ties, the general construction being the same.

What I claim as my invention, and desire to secure by letters patent, is—

The obtuse angular shape given to the crimp or corrugations longitudinally, constructed, arranged, or operating substantially as and for the purpose set forth.

JOSEPH KEECH.

Witnesses:
WM. KNOX.
HORACE FIELD GUSTIN.

Ex'd., E. A. M., C. F.

(Here follows diagram, marked page 48.)

48 Printed copy of the specification and drawing, uncertified, of the letters patent granted to Bellus and Bowers, dated September 7th, 1869, No. 94551, for improvement in wash-boards, marked Defendants' Exhibit 6. O. W. B., *N. P.*

(Here follows diagram, marked page 49.)

49 UNITED STATES PATENT OFFICE.

William Bellus and C. Bowers, of Fredonia, Ohio. Letters patent No. 94551, dated September 7, 1869. Improved wash-board.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that we, William Bellus and C. Bowers, of Fredonia, in the county of Licking and State of Ohio, have invented a new and improved wash-board; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The object of this invention is to provide a more simple and durable construction of wash-boards than the present arrangement of them.

The invention consists in forming the metallic rubbing-surfaces by placing a sheet of zinc or other suitable metal on a wood base, and driving large round-headed tacks through the same into the board, so that the round or oval heads, together with the sheet-metal plate, form the rubbing-surface, all as hereinafter more fully specified.

Figure 1 represents a front elevation of our improved wash-board, and Figure 2 represents a longitudinal sectional elevation of the same.

Similar letters of reference indicate corresponding parts.

A represents a piece of board, of suitable size and shape for the base of the wash-board.

B, a sheet of zinc or other metal, of the same size and shape.

D represents rivets, with large round or oval heads, with which we secure the two together, arranging the said tacks in regular order, at suitable distances apart, over the whole surface of the sheet B. These tack-heads make an uneven surface, well adapted for the rubbing-surface for washing.

The board thus made may be provided with suitable side and top rails D, and with a recess, E, at the top.

This construction is very simple and cheap, and it provides a very durable board. The tacks should also be of zinc or other non-corrosive metal.

Having thus described our invention, what we claim as new, and desire to secure by letters patent, is—

The wash-board, constructed with a wood base, A, and a sheet-metal plate, B, riveted by tacks C, having large round or oval heads, and arrange as specified.

WM. BELLUS.
C. BOWERS.

Witnesses:
I. WRIGHT.
CHARLES SAXTON.

(Endorsed:) Filed Oct. 9th, 1877. Wm. H. Bradley, cl'k.

(Indorsed:) U. S. circuit c't.

50 Printed copy of the specification and drawing, uncertified, of the letters patent granted to A. R. Crihfield, dated October 18th, 1870, No. 108456, for improvements in wash-boards, marked Defendant's Exhibit 7. O. W. B., *N. P.*

(Here follows diagram, marked page 51.)

51 UNITED STATES PATENT OFFICE.

Aylett R. Crihfield, of Lincoln, Illinois. Letters patent No. 108456, dated October 18, 1870. Improvement in wash-boards.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Aylett R. Crihfield, of Lincoln, in the county of Lo-

The object of this invention is to provide a more simple and durable construction of wash-boards than the present arrangement of them.

The invention consists in forming the metallic rubbing-surfaces by placing a sheet of zinc or other suitable metal on a wood base, and driving large round-headed tacks through the same into the board, so that the round or oval heads, together with the sheet-metal plate, form the rubbing-surface, all as hereinafter more fully specified.

Figure 1 represents a front elevation of our improved wash-board, and Figure 2 represents a longitudinal sectional elevation of the same.

Similar letters of reference indicate corresponding parts.

A represents a piece of board, of suitable size and shape for the base of the wash-board.

B, a sheet of zinc or other metal, of the same size and shape.

D represents rivets, with large round or oval heads, with which we secure the two together, arranging the said tacks in regular order, at suitable distances apart, over the whole surface of the sheet B. These tack-heads make an uneven surface, well adapted for the rubbing-surface for washing.

The board thus made may be provided with suitable side and top rails D, and with a recess, E, at the top.

This construction is very simple and cheap, and it provides a very durable board. The tacks should also be of zinc or other non-corrosive metal.

Having thus described our invention, what we claim as new, and desire to secure by letters patent, is—

The wash-board, constructed with a wood base, A, and a sheet-metal plate, B, riveted by tacks C, having large round or oval heads, and arrange as specified.

WM. BELLUS.
C. BOWERS.

Witnesses:
I. WRIGHT.
CHARLES SAXTON.

(Endorsed:) Filed Oct. 9th, 1877. Wm. H. Bradley, cl'k.

(Indorsed:) U. S. circuit c't.

50 Printed copy of the specification and drawing, uncertified, of the letters patent granted to A. R. Crihfield, dated October 18th, 1870, No. 108456, for improvements in wash-boards, marked Defendant's Exhibit 7. O. W. B., *N. P.*

(Here follows diagram, marked page 51.)

51 UNITED STATES PATENT OFFICE.

Aylett R. Crihfield, of Lincoln, Illinois. Letters patent No. 108456, dated October 18, 1870. Improvement in wash-boards.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Aylett R. Crihfield, of Lincoln, in the county of Lo-

gan, and in the State of Illinois, have invented certain new and useful improvements in wash-boards; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction of a wash-board, as will be hereinafter set forth.

Figure 1 represents a wash-board with my invention; and

Figure 2 represents a cross-section of the zinc board.

In the accompanying drawing—

A represents the usual frame of a wash-board, having a receptacle, B, at its top, for soap or for clothing.

C represents the central portion, or surface, upon which the clothes are rubbed. This portion is made of zinc or other suitable material, and is composed of a series of irregularly-placed diamond-shaped raised pieces, *a a*. These diamond-shaped raises are arranged in rows crosswise of the board, from top to bottom, each alternate row being composed of more elevations than those of the intermediate rows, as shown at *x y* in Fig. 1, the rows marked *x* in the drawing having five diamonds placed a short distance apart, and those marked *y* having four diamonds a little apart. The rows marked *y* are so placed that the elevations are under the spaces between those of the rows marked *x*, thus forming a series of oblique channels up and down the board from either side.

By this arrangement and construction of the face of the wash-board, the flexibility of the hand of the washer and the clothing gives a lateral and up-and-down motion to the clothes, causing them to move over considerable space with little exertion, and effectually cleansing the clothing within a short space of time.

The boards thus formed can be stamped out by die-plates in a short time, and introduced at very slight expense.

Having thus fully described my invention, what I claim, and desire to secure by letters patent, is—

In combination with the frame A, the metal surface C, composed of a series of diamond-shaped elevations, *a*, made in cross-rows *x* and *y*, as described, and forming the oblique channels *d d*, all as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 20th day of May, 1869.

A. R. CRIHFIELD.

Witnesses:

JOHN KIRKPATRICK.

H. NELSON HAMMOND.

(Endorsed:) Filed Oct. 9, 1877. Wm. H. Bradley, cl'k.

52 Certified copy of the letters patent granted to Wm. M. Galusha and Benjamin W. Safford, dated December 29th, 1857, No. 18965, for improvement in wash-boards, marked Defendants' Exhibit 9. O. W. B., *N. P.*

(Here follow 2 diagrams, marked page 53.)

53 DEFENDANTS' EXHIBIT 9.—O. W. B., *N. P.*

DEPARTMENT OF THE INTERIOR.

United States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted William M. Galusha and Benjamin W. Safford, dated December 29th, 1857, No. 19865, for improved wash-board.

In testimony whereof I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this second day of April, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

The United States of America to all to whom these letters patents shall come:

Whereas William M. Galusha and Benjamin W. Safford, of Arlington, Vt., have alleged that they have invented a new and useful improved wash-board, which they state has not been known or used before their application; have made oath that they are citizens of the United States, that they do verily believe that they are the original and first inventors or discoverers of
54 the said wash-board, and that the same hath not, to the best of their knowledge and belief, been previously known or used; have paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said wash-board, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said William M. Galusha and Benjamin W. Safford, their heirs, administrators, or assigns, for the term of fourteen years from the twenty-ninth day of December, one thousand eight hundred and fifty-seven, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said wash-board, a description whereof is given in the words of the said William M. Galusha and Benjamin W. Safford in the schedule hereunto annexed and is made a part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this twenty-ninth day of December, in the year of our Lord one thousand eight hundred and fifty-seven, and of the Independence of the United States of America the eighty-second.

[SEAL.] JACOB THOMPSON,
Secretary of the Interior.

55 Countersigned and sealed with the seal of the Patent Office.

J. HOLT,
Commissioner of Patents.

The schedule referred to in letters patent and making part of the same.

To all whom it may concern:

Be it known that we, Wm. M. Galusha and Benjamin W. Safford, of Arlington, in the county of Bennington and State of Vermont, have invented a new and improved wash-board, and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification in which—

Fig. 1 is a front or face view of our improvement.

Fig. 2 is a longitudinal central section of do.

Fig. 3 is a horizontal central section of do.

Fig. 4 is a section of the corrugated plate in perspective.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to an improvement in that class of wash-boards in which corrugated sheet metal is used for a rubbing surface. The improvement consists in the peculiar form of corrugations, whereby the board is rendered quite stiff, a good rubbing surface obtained, or one well calculated to subject the clothes, as they are pressed upon and passed over it,
56 to a requisite degree of friction, and at the same time afford proper channels for the escape or passage of the water so as to prevent the splashing of the same.

To enable those skilled in the art to fully understand and construct our invention, we will proceed to describe it.

A represents the frame of the wash-board, which may be constructed in the usual way, viz, two side pieces or strips (*a*) (*a*) connected by cross-bars (*b*) (*b*). The frame may be constructed of wood.

B is the corrugated portion of the board. This is formed of sheet metal corrugated. The corrugations may be formed by "striking up" the metal plate with dies, or in any proper or desirable way. The corrugations are formed of a series of elevations (*c*) and depressions (*d*), the elevations and depressions being in parallel rows, and in alternate positions with respect to each other, as shown clearly in Fig. 1.

The form of the corrugations are oblong, the ends (*e*) and sides *f* being inclined, and the edges (*g*) somewhat rounded. The rounded edges (*g*) are shown clearly in Fig. 2, each elevation forming a figure approximating to a semi-cylinder pointed at each end, the ends of the elevations in one row overlapping the ends of those in the adjoining rows. See Figs. 1 and 4. By this form of corrugation, channels, as indicated by the arrows, are formed for the escape of water down the plate B into the tub.

57 The part B has its edges fitted in grooves (*h*) formed in the inner sides of the strips (*a*) (*a*) and cross-bars (*b*) (*b*), and is hereby secured within the frame A. See Figs. 2 and 3. Sheet zinc will probably be used for the part B; at least this would be the most desirable material.

By having the corrugations of the form as shown, the part B is rounded quite stiff, and will not yield or give as the clothes are pressed upon it. The corrugated sheet-metal plates hitherto used for such purpose, so far as we are aware, have been corrugated so as to form parallel plates extending entirely across the plate. This form of corrugation renders the plate very elastic or yielding, and also has a tendency to splash the water, no

channels being formed for its escape down the plate into the tub. By our improvement these objections are obviated.

We do not claim broadly the employment or use of a corrugated sheet-metal plate for the rubbing surface of a wash-board, for they have been previously used, but

We claim as new, and desire to secure by letters patent, corrugating the sheet-metal plate in the form specifically as herein shown and described for the purpose set forth.

WILLIAM M. GALUSHA.
BENJAMIN W. SAFFORD.

Witnesses:
I. McLAUGHLIN.
HENRY GALUSHA.

Ex. J. A. W., M. M.

58 Certified copy of the letters patent granted to John S. Lash, dated August 29th, 1865, No. 49635, for improvements in wash-boards, marked defendants' Exhibit 11, O. W. B., *N. P.*

59 DEFENDANTS' EXHIBIT 11.—O. W. B., *N. P.*

DEPARTMENT OF THE INTERIOR.

United States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted John S. Lash, dated August 29th, 1865, No. 49635 for wash-boards.

In testimony whereof I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fourth day of April, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

The United States of America to all to whom these letters patent shall come:

Whereas John S. Lash, of Philadelphia, Pennsylvania, has alleged that he has invented a new and useful wash-board which he states has not been known or used before his application; has made oath that he is a citizen of the United States, that he does verily believe that he is the original and first inventor or discoverer of the said invention, and that the
60 same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said invention, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said John S. Lash,

his heirs, administrators or assigns, for the term of seventeen years from the twenty-ninth day of August, one thousand eight hundred and sixty-five, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said invention, a description whereof is given in the words of the said John S. Lash in the schedule hereto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this twenty-ninth day, of August, in the year of our Lord one thousand eight hundred and sixty-five, and of the Independence of the United States of America the ninetieth.

61 W. T. OTTO,
Acting Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.
T. C. THEAKER,
Commissioner of Patents.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, John S. Lash, of the city of Philadelphia, in the State of Pennsylvania, have made certain new and useful improvements in wash-boards for washing clothes, and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 represents a perspective view of the wash-board as ready for use.

Figure 2 represents a face view of the movable rubbing board detached from its other portion.

Figure 3 represents a transverse longitudinal section through the wash-board.

Similar letters of reference, where they occur in the separate figures, denote like parts in all the drawings.

My invention consists in the construction and arrangement of
62 the rolls in the under portion of the wash-board and the depressions and elevations in or on the face of the rubbing board so that the clothes as they pass between the rubbing surfaces shall be acted upon by surfaces that have different motions and thus receive a positive washing or rubbing operation.

To enable others skilled in the art to make and use my invention I will proceed to describe the same with reference to the drawing:

A represents the under frame, which may be made in any of the usual well-known ways. In this frame I arrange a series of rollers, B, so that they may freely turn upon their journals by the act of moving the clothes over them under pressure.

The rollers B, as to surface, may have the form of a series of cones united alternately by their bases and apices, as shown at *b a* respectively, or these projections and depressions, instead of being conical in form, may be of a bead, a cone, or ogee form. And the rollers are so arranged in the frame as that the elevated portions of one shall fit into the depressions of

the next adjacent one, and vice versa, leaving space enough between for the water to freely pass through.

The rubbing board C has cut upon its face a series of grooves, C,
63 that will take the projecting portions *b* of the rollers, whilst its bands, *d*, will move along and over the depressions *a* thereof; or, in other words, the contour of the face of the wash-board is similar to that of the rolls in reverse, thus allowing the two surfaces to move in close contact and parallel to each other. There are also cross-grooves, *e*, in or on the face of the wash-board for carrying or moving the clothes along over the rolls and preventing them from lying in one place or for holding them against the rollers.

To the wash-board C are attached at both of its sides spring-arms D, the ends of which, as the board is reciprocated, move in grooves or slots, *f*, cut in the outside pieces of the under frame A and guide and direct said board in its movement. These arms may have elasticity enough to admit of their being taken out of their grooves when it is necessary to remove or detach the rubbing board from the under portion. And instead of being bent, as shown, the wash-board may be made long enough to be flush with the sides of the frame, and then straight arms may be used, and if found advantageous may be of wood instead of metal.

E is a rung or handle by which the rubbing board is moved, and at the same time the necessary degree of pressure applied by the hand
64 of the operator. The wash-board can be also raised up to place or remove the clothes or inspect the operation of washing, the arms D serving as pivots upon which it thus turns.

If desirable for finer clothes that might otherwise be damaged the wash-board can be thrown back, and the under portion used as a common wash-board is.

The surface of the rolls being of different diameters would have, of course, different velocities, but wash-board surfaces have alway' uniform velocities, thus between the two surfaces the clothes receive a rubbing operation like hand washing, the grooves *e* serving to move them along or to retain them as the case may be.

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent is—

In combination with a series of rollers of the form herein described, and arranged in relation to each other as set forth, a rubbing board having longitudinal and transverse grooves in or on its face and acting with said rollers as herein described and represented.

JOHN S. LASH.

Witnesses:
WILLIAM B. GREGG.
M. HOLCOMB.

Ex'd, E. A. M., C. F.

(Endorsed:) Filed Oct. 9th, 1877. Wm. H. Bradley, clerk.

(Here follows diagram, marked page 65.)

65 Deposition of David J. Powers, which is set out on page 156 of this transcript.

Deposition of Aaron J. Hull, which is set out on page 172 of this transcript.

Printed copy of specification and drawing of the letters patent granted to Aaron J. Hull, dated December 29th, 1875, No. 171568, marked Defendants' Exhibit 14, O. W. B., *N. P.*

(Here follows diagram, marked page 66.)

66 DEFENDANTS' EXHIBIT 14.—O. W. B., *N. P.*

UNITED STATES PATENT OFFICE.

Aaron J. Hull, of Sterling, Illinois, improvement in wash-boards. Specification forming part of letters patent No. 171568, dated December 28, 1875; application filed December 3, 1875.

To all whom it may concern:

Be it known that I, A. J. Hull, of Sterling, in the county of Whitesides, and in the State of Illinois, have invented certain new and useful improvement in wash-boards; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to the ordinary sheet-metal wash-board; and it consists in providing the sheet metal with diamond-shaped projections, each bounded by diagonal grooves or depressions, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a front view of a wash-board embodying my invention. Fig. 2 is a section of the sheet metal through the line *x x*, Fig. 1. A represents the line or other sheet metal used in wash-boards. This
67 metal plate is crimped to form oblong diamond-shaped projections B B, having the longest diameter running transversely across the board, as shown. Each projection, B, is bounded by a diagonal groove or depression *b*, as shown particularly in Fig. 1. The upper corner of each diamond, B, where the grooves cross each other, is raised higher than any other part of the same, while the corresponding lower corner is the lowest part of the diamond.

Having thus fully described my invention, what I claim as new, and desire to secure by letters patent is—

A wash-board of sheet metal, formed with a series of raised diamond-shaped projections, B, and a series of narrow diagonal grooves, *b*, between the projections which cross each other, substantially, as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of November, 1875.

AARON J. HULL.

Witnesses:
W. A. MCCUNE.
R. CHAMPION.

(Endorsed:) Filed Oct. 9, 1877. Wm. H. Bradley, clerk.

68 Deposition of Amos Fassett, which is set out on page 176 of this transcript.

Deposition of William Cavert, which is set out on page 179 of this transcript.

Deposition of Samuel A. Gould, which is set out on page 183 of this transcript.

Deposition of Andrew J. Upham, which is set out on page 186 of this transcript.

Deposition of John D. Tracy, which is set out on page 189 of this transcript.

Deposition of Norman Clark, which is set out on page 195 of this transcript.

Copy of specification and drawing of the letters patent granted to Joseph Hyde, dated August 1st, 1854, No. 11426, for improvement in wash-boards, admitted at the hearing by order of the court.

(Here follows diagram, marked page 69.)

69 Joseph Hyde, of New York, N. Y. Letters patent No. 11426, dated Aug. 1st, 1854.

To all whom it may concern:

Be it known that I, Joseph Hyde, of the city and State of New York, have invented certain improvements in wash-boards, and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings making a part of this specification, in which—

Fig. 1 is a perspective view of the "board" with the "rubber" combined with it.

Fig. 2 is a longitudinal edge section.

Fig. 3 is a perspective view of the rubber detached from the wash-board, the opposite side being shown to that represented in Fig. 1.

The same letters refer to like parts in each of the figures.

The nature of my invention consists, firstly, in forming the surface of a wash-board of a congeries of projections or knuckles, prominent and distinct, (although not necessarily disconnected) and of a substance in itself elastic or semi-elastic.

Secondly. My invention consists in combining, in a peculiarly handy and simple way with such a "wash-board" a "rubber," which may be a scouring brush with elastic knuckles on its reverse side, and the "rub-
70 ber" may be so arranged as to present either surface to the wash-board at the will of the operator.

The construction is as follows:

A, Fig. 1, is a frame of any usual or convenient form, holding a panel, B, of wood or metal, and rather thin as compared with its equivalent in an ordinary wash-board.

This panel is pierced with holes, through which are forced short round-ended cylinders of vulcanized caoutchouc or gutta percha of greater diameter than the holes, after which the extremities of these cylinders will expand against those adjoining, and assume the form of round-headed rivets (see Fig. 2), together constituting a series of elastic knuckles over the whole sur-

face of the wash-board. *c* is the "rubber," the brush side exposed (the reverse side being shown at Fig. 3) and is connected to the board at (*a*) by the intermediate "toggle" links or levers (*b*) and so that at the trunnions (*c*) the "rubber" may revolve or "swivel" between the ends of the toggle-levers. It will now be seen that a person standing at the head of the board, which may be of the ordinary size, and the feet of the board resting upon the bottom of a wash-tub in the usual way, the article to be washed being placed upon the face of the board, and the "rubber" being raised and placed upon the article, the edge or a fold of the article being pinched against the lower edge of the "rubber" by the fingers, and the rubber itself
71 being firmly grasped by the whole hand or hands, it will be seen that the article may be thoroughly rubbed with any desired pressure, the toggle allowing the rubber to move up and down squarely over the board, and without the knuckles of the hands being called into play at all, and articles of the coarsest or most delicate texture may be perfectly treated in a way to correspond to its nature without the employment of a cumbersome washing machine on the one side, or any abrasion of the fingers on the other. The rubber, however, may be moved up into the recess (*d*) out of the way if desired as occasion may require. The opposite sides of the board are alike, and either may alike be employed, the rubber, it will be obvious on inspection of the figures, being capable of passing over the head of the board to either side of it indifferently, and would present precisely the same appearance and mode of operation.

The knuckles or projections can also be formed in another way—although substantially the same in nature—in this latter mode of constructing or forming my yielding knuckled rubbing surface for wash-boards, the difference being that in lieu of the India-rubber rivets I form the knuckles by threading through and through the panel or face of the board, shoemaker fashion, India-rubber cord, or even cotton cord, which proves a very cheap
72 and serviceable substitute, or cotton cord, covered or coated with caoutchouc, may be used. The cord should be evenly twisted, and drawn in taut, and, of course, fastened by a knot or any convenient means at each extremity. All things considered, I prefer this modification to the other. The effectiveness and beauty of operation of my device for its purpose, both as regards the peculiar character of the rubbing surfaces and the convenient mode of attachment and action of the "rubber," will be seen without any lengthy expatiation. I am aware that cushions or pads of India rubber have been used in "washing-machines" for "rubbers," acting on a common board (which formed an item in such machines), but it is not the material so much as the form under which it is brought into action. Thus, I find cotton nearly or quite as good as India rubber for material. I find no form of surface, however, to compare with the "knuckles" for rubbing and cleansing textile substances.

Having thus fully described the nature of my invention, what I claim as new and desire to secure by letters patent, is—

First. The employment of the elastic or semi-elastic "knuckles," each distinct, but the whole forming a compact series over the whole rubbing surface of a wash-board of any usual or convenient form by methods substantially as described.

73 Secondly. I claim, in combination therewith, the rubber connected to it substantially as described, so as to reverse to either side

of the "board," and "swiveling," if desired, in its own immediate bearings, for the purpose described.

JOSEPH HYDE.

Witnesses:
A. SHAMON.
JOSEPH PEACOCK.

Ex'd, M. C. S.

74 Copy of the specification and drawing of the letters patent granted to Ira S. Parker, dated January 15th, 1856, No. 14111, for improvement in wash-boards, admitted at the hearing by order of the court.

(Here follows diagram, marked page 75.)

75 Ira S. Parker, of Sharon, Vt. Letters patent No. 14111, dated Jan. 15, 1856.

To all whom it may concern:

Be it known that I, Ira S. Parker, of Sharon, in the county of Windsor, State of Vermont, have invented a new and improved wash-board, and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings making a part of this specification, in which—

Fig. 1 is a side or face view of my improvement.

Fig. 2 is a horizontal section of do. (*x*) (*x*), Fig. 1 showing the plane of section.

Similiar letters of reference indicate corresponding parts in the two figures.

The nature of my invention consists in forming the wash-board of a series of cylindrical beaded bars arranged as will be presently shown and described.

A represents the bars, which are of cylindrical beaded form. The upper ends of the bars A are inserted in the edge of a board, B, and the lower ends are inserted in the lower edge of a board, C.

The beads designated by (*a*) are of elliptical form, and are at equal distances apart on the base A, leaving suitable space (*b*) between them.

76 The bars A are turned out of wood, and are of a suitable length and thickness, the beads (*a*) being rather larger in diameter than the thickness of the boards B, C, as shown in Fig. 2.

Any proper number of bars, A, may be used, and the beads (*a*), when the ends of the bars are secured in the edges of the boards B, C, are side by side in horizontal rows, thereby leaving spaces (*e*) between the beads and bars.

The beads (*a*) form the necessary corrugations over which the clothes are rubbed in the usual way, the wash-board being placed in the tub as usual.

The wash-board thus constructed may be used on either side, and the water is not scattered around during the process of rubbing the clothes, as it passes through the spaces (*e*) into the tub. The clothes also, in consequence of the beads (*a*), are rubbed over the ends of the grain of the wood, and the clothes are thereby subjected to more friction than the or-

dinary corrugated boards, the flutes or corrugations of which run lengthwise of the grain of the wood.

The invention is simple, durable, economical to manufacture, and far preferable to the ordinary wash-boards in use.

Having thus described my invention, what I claim as new and desire to secure by letters patent, is:

77 Constructing the wash-board of a series of cylindrical, beaded bars, A, the ends of which are secured in boards B, C, the beads (*a*) of the bars being side by side in horizontal rows so as to leave spaces (*c*) between them, substantially as shown and described.

IRA S. PARKER.

Witnesses:

PELATIAH METCALF.
MOSES PRESTON.

Ex'd, I. M. B.

78 Copy of specification and drawing of the letters patent granted to Warren Hill, dated August 6th, 1861, No. 32994, for improvement in wash-boards, admitted at the hearing by order of the court.

79 U. S. PATENT OFFICE.

No. 1990. 1861. Whole No. 32994. Wash-boards. Warren Hill, of East Smithfield, Pa. Letters patent No. 1990, dated August 6, 1861.

SPECIFICATION.

To all whom it may concern:

Be it known that I, Warren Hill, of East Smithfield, in the county of Bradford and State of Pennsylvania, have invented a new and improved wash-board; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a front elevation of my invention.

Figure 2 is a transverse vertical section of ditto.

Similar letters of reference in both views indicate corresponding parts.

This invention consists in the employment of a metallic plate provided with semispherical projections or knuckles, and secured by means of lugs and pins in a wooden frame, the upper end of which forms a receptacle for the soap, while its lower end is furnished with legs that rest on the bottom of the wash-tub, similarly to an ordinary wash-board; the whole being so arranged that the wooden frame is secured together by the metallic plate, and that a wash-board is produced capable to withstand the injurious influences of the water.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation with reference to the drawing.

A represents a solid and rigid plate of cast-iron, or other metal, provided with a number of semispherical projections or knuckles *a*, as clearly shown in the drawing. These knuckles are arranged at such distances apart, and in such order that channels are formed between them to let the water run off.

Figure 2 is a top view of the machine.

Figure 3 is a plan view of the vibrating rubbing rollers.

Figure 4 is a face view of the wash-board; and

Figures 5 and 6 show respectively a transverse and a longitudinal section through Figure 5.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain new and useful improvements on the machine secured to me by letters patent bearing date May 4, 1858.

84 The object of my present invention is to more effectually prevent the articles being washed from working out at the ends of the rubbing rollers and causing the machine to work hard and imperfectly, and at the same time to prevent any undue straining of the articles.

It also has for its object effecting an economy of soap by subjecting the articles to much stronger soap-suds while they are being rubbed than is contained in the body of the wash-tub; all as will be hereinafter described and represented.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the accompanying drawings A represents the wash-box, which is constructed with vertical longitudinal sides and inclined ends, and a ledge, *a*, surrounding the upper edge at one end of the box, as shown in figure 2. This box A is mounted on legs B B, and has two upright standards, *c c*, affixed to the sides, which project up some distance above the box, and receive in their ends grooved bearing boxes, *b b*, which are mounted on springs *c c*, and receive and support the transverse rock-shaft D, which supports the rubbing rollers *d d d*. The ends of the rock-shaft D

85 project out from the outside of each block *b* and receive the ends of connecting rods *e e*, which proceed downwards and are attached to the ends of a transverse rod, *f*, which has connected to it a treadle, E. This treadle is used for depressing the rollers *d d d*, and the springs *c c* are used for elevating the rubbing rollers *d d d*.

The rollers *d* have their end bearings in the segmental side pieces *g g*, which are connected together by transverse bars *g' g'*, and the whole are connected to parallel arms *h h*, which are suspended from the rock-shaft D.

In one end of the box A the "concave" or wash-board is arranged, the surface of which is concentric with the centre of vibration of the rubbing rollers when these rubbers are at their highest point shown in Figure 1.

This wash-board is made of a number of slats which have spirally-ribbed surfaces, the ribs of which run in opposite directions on each alternate slat, so that a number of such slats (*i i*) arranged side by side present the appearance of zigzag ribs running from one side of the box to the other, as shown in Figures 2 and 4.

These spirally-ribbed slats (*i i*) incline downwards from the upper towards the lower end of the inclined end of box A, and they are

86 nailed to transverse ledges, *k k k'* shown in figure 1. These rubbing surfaces or slats are furnished with a bottom board, G, which forms a space, *m*, beneath them for containing strong soap-suds, and the ledges *k k* keep a sufficient quantity of soap-suds under the slats for all practical purposes. The serrated or scalloped edges of the slats *i i* do not fit so closely together as to prevent the soap-suds beneath them from mix-

ing with the water which is drawn up from the main body of the tub A, with the clothes, as they are brought over these slats to be rubbed; but should these spaces not be found sufficient the slats themselves may be perforated, the perforations being made between the ribs, as shown in the drawings 2 and 4.

The rubber is composed of a number of rollers, *d d*, arranged in a curve concentric with the axis of the rock-shaft D shown in Fig. 1. These rollers are spirally grooved, the grooves running from one end of one roller to about two-thirds the length of this roller in one direction, and for the other third in the opposite direction. Thus at the ends of these rollers the grooves run in opposite directions, the object of which is to cause the rollers to move the clothes, which are subjected to their rubbing action towards the middle of the wash-board, just sufficiently so, how-
87 ever, to prevent the clothes from working out at the ends of the rollers. Each roller having a right and left spiral groove formed in its surface, the tendency is to move the clothes back and forth laterally on the wash-board and thus to subject every portion thereof to the rubbing and squeezing action of the two spirally-grooved surfaces of the rubber and wash-board.

In using the machine water is put into the main body of the tub and strong soap and water, soft soap or "washing compound" of any description, and the clothes are drawn from the rinsing water in the tub over the concave wash-board where the "soap-suds" contained in the space *m* will mix with the water in the clothes as they are rubbed and squeezed by the rubbing rollers *d d d*, the pressure of these rollers being increased or diminished on the clothes by pressing with greater or less force upon the treadle E. The strong soap-suds can in this way be brought to act directly upon the clothes in only such quantities as may be required, and being kept in a separate receptacle there will be a great deal of soap saved which would otherwise be mixed with the body of water in the tub A.

What I claim as my invention is—

1st. The wash-board composed of alternately right and left or zigzag open surfaces, substantially as described.

88 2nd. A wash-board constructed with a soap-suds receptacle arranged beneath the open slatted surface *i i* substantially as and for the purposes described.

3rd. Combining with the zigzag ribbed and waved wash-board the spirally-ribbed rollers, the ribs of which run in opposite directions on each roller, substantially as and for the purposes herein described.

Witness my hand in the matter of my application for a patent for an improved washing-machine, this 11 day of June, A. D. 1863.

ASHMAN HALL.

In presence of two witnesses:

C. P. JONES.

FRANK STEINHARDT.

Ex'd, L. P. H.

(Here follows diagram, marked page 89.)

89 Copy of specification and drawing of the letters patent granted

to Nelson Homes, dated April 11th, 1865, No. 47206, for improvement in wash-boards, admitted at the hearing by order of the court.

(Here follows diagram, marked page 90.)

90 Nelson Homes, Laona, New York. Letters patent No. 47206, dated April 11th, 1865. Improved wash-board.

To all whom it may concern:

Be it known that I, Nelson Homes, of Laona, in the county of Chautauqua and State of New York, have invented a certain new and useful improvement in wash-boards; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification:

Fig. 1 is a prospective view of my improved wash-board resting in a tub.

Fig. 2 a central longitudinal vertical section of the same.

Fig. 3 a plan of a portion of the washing-bed on an enlarged scale.

Fig. 4 an edge view of one of the corrugated strips or bars forming the washing-bed, detached, and showing the spring or elasticity of the same.

Like letters of reference indicate corresponding parts in all the figures.

A variety of wash-boards, with the bed made of wood, has long been employed.

In the oldest device in common use the bed is formed of a single stiff board, corrugated transversely. In another, a series of stiff beaded rollers, placed side by side, with the beads alternating, is employed.

91 And still in a third, a sort of honey-comb arrangement is used, having cavities and ridges in a single stiff board. But in all these there are objections, the most important of which are that they are stiff and inelastic, and do not retain the water upon their surfaces sufficiently long to perform the washing to advantage.

It is the object of my invention to obviate these difficulties by producing a wash-board made up of strips or bars, with plane edges situated closely together, so as to prevent water escaping through, and corrugated in such a manner that the ridges of one bar will alternate with those of the next, &c., so as to form cells to retain the water to the best advantage, and so arranged as to produce an elastic surface.

As represented in the drawings, A is a frame of any ordinary or convenient construction for supporting the washing-bed. This bed is made up of a series of slats or bars, B, B, B, sawed from a board or the block in such a manner as to leave plane, square edges which, when placed side by side in the bed longitudinally, leave no opening between, but merely a joint, as shown most clearly in Fig. 3. These bars or strips are corrugated transversely, so as to leave alternate ridges or projections, *a*, *a*,

92 and intermediate hollows or depressions, *bb*, and when the bars are situated side by side in the bed, the ridges of one bar come opposite the depression of the next; or, in other words, the ridges of one bar alternate with those of the next. The ends of the slats or bars may be secured in the frame of the wash-board in any desirable manner, being represented in the drawings as having bearings, *c*, *c*, which enter grooves in the cross pieces *d d*.

I secure several advantages in the arrangement above described. I avoid the use of a stiff, unbroken, unyielding board, such as the old device in common use, and employ in the place an elastic bed, which is still as tight or nearly so as the other, as the plane edges of the slats fit closely together and thus effectually prevent the water drawn up with the clothing from running through. The narrowness of the slats allow' each to spring independently, as indicated by red lines—Fig. 4. In this respect also the superiority of my arrangement over the wash-board made up of beaded rounds or bars is manifest, for in the latter the large openings between the beads allow a free passage of the water through, so that there can be no retention; and in such device also there is no elasticity of the bed. It will be seen that by alternating the ridges *a a* of my slats that the
93 cavities *b b* are enclosed in such a manner that the water is retained therein (there being no passage through the bed) so that there is a constant supply.

I am aware of no other device where these several qualities are combined.

What I claim as my invention and desire to secure by letters patent is—The wash-board composed of the plane-edged slats or bars *B B* fitting closely together so as to prevent the passage of water through, and having a necessary degree of elasticity, said slats being provided with corrugations, *a a*, *b b*, so arranged that the corrugations of any one that alternate with the next substantially as and for the purposes herein set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

NELSON HOMES.

Witnesses:
FREEMAN LAKE.
E. D. HOMES.

(End.:) H. H.

94 Complainants introduced and read in evidence the following documents and depositions in reply, to wit:

Deposition of Frank Millward, which is set out on page 103 of this transcript. Deposition of LaFayette Lyttle, which is set out on page 121 of this transcript. Deposition of Edward A. Kitsmiller, which is set out on page 123 of this transcript.

Letter-press copy of a letter sent John S. Lash, marked Complainant.' Exhibit E, A K[5], which is as follows:

OCT. 16TH.

Mr. JNO. S. LASH, *Philadelphia, Pa.:*

DEAR SIR: Are you making wash-boards under your patent 49635, dated August 29th, 1865? If you are, please send us one by express with invoice or C. O. D., as you wish.

If you are not making them, do you know of any one who is, and can you place us in a position to get one of the wash-boards?

We enclose stamped envelope, and asking early reply are,

Very truly, yours,

P. DUFF AND SONS.

95 Original reply of said Lash, marked Complainants' Exhibit E, A. K.[6], which is as follows:

PHILAD., *Oct. 20th*, 1876.

P. DUFF & SONS:

Yours of 16th rec'd, and in reply would say that I am not making any of the wash-boards referred to, nor do remember whether any have ever been made.

I have had letters from several others asking for information about the wash-board lately. Will you please inform me what there is in it, and oblige,

Yours, truly,

JOHN S. LASH.

1307 MARKET ST.

96 Deposition of William O. Dakin, which is set out on page 125 of this transcript.

Deposition of Robert S. Janney, which is set out on page 127 of this transcript.

Deposition of Samuel Herzig, which is set out on page 130 of this transcript.

Deposition of Charles F. Bischoff, which is set out on page 136 of this transcript.

Deposition of George A. Hanlin (also printed George H. Hanlers), which is set out on page 139 of this transcript.

Deposition of Urania Janney, which is set out on page 145 of this transcript.

Deposition of Ellen McDermott, which is set out on page 146 of this transcript.

Deposition of Mrs. Anna Nessler, which is set out on page 147 of this transcript.

Deposition of Mrs. Ella M. Hanlen, which is set out on page 149 of this transcript.

Deposition of Mrs. Abbie L. Andrews, which is set out on page 149 of this transcript.

Deposition of La Fayette Lyttle, which is set out on page 150 of this transcript.

97 United States circuit court, northern district of Illinois.

MRS. PETER DUFF ET AL.
vs.
THE STERLING PUMP COMPANY. } In equity.

At Chicago, Ill., on this 15th day of November, A. D. 1876, before O. W. Bond, notary public.

Present, L. L. Bond, esq., for complainant. Defendant was duly notified, but did not attend, by counsel or otherwise.

At ten o'clock in the forenoon, pursuant to the notice hereto annexed, the parties to the said cause, by their counsel as above, met at the office of Messrs. West & Bond, room 8, No. 208 La Salle St., Chicago, Ills., when the following proceedings were had:

EDWARD A. KITZMILLER, a witness produced on the part of the complainants, being first duly sworn, deposes and says, in answer to interrogatories to him propounded by L. L. Bond, esq., as follows:

98 Int. 1. State your name, age, residence, and occupation.

Ans. My name is Edward A. Kitzmiller; I am thirty-six years old; I live in Wilkins Township, Alleghany County, Pennsylvania; I am a merchant and manufacturer; place of business, Pittsburgh, Pennsylvania.

Int. 2. Do you know the parties complainant and defendant; and, if so, how long have you known them respectively?

Ans. I am a member of the firm of P. Duff & Sons, complainants in this case, and have been in business with them since 1869. I do not know the defendant, except Mr. Hull, the president, whom I first met a few days prior to the commencement of this suit.

Int. 3. Do you know whether or not the defendant is manufacturing wash-boards, or was so engaged prior to the commencement of this suit? And, if so, state what kind or variety of board it was then making.

Ans. I met Mr. Hull, the president, a few days prior to the commencement of this suit, and had with me a board, marked on the back "Hull's Patent, £, pat'd Dec. 28, 1875, double surface, every board warranted." Mr. Hull admitted that the Sterling Pump Company had made this identical board, and were making and selling wash-boards identically the same as the board referred to. I have also seen such boards on the market for sale.

Int. 4. Have you in your possession the wash-board which you had at the time you met Mr. Hull; and, if so, will you produce it?

Ans. I have, and now produce it.

(Board produced by witness, offered in evidence, and the same is marked Complainants' Exhibit C, O. W. B., *N. P.*

Counsel for complainants offers in evidence reissued letters patent granted to Mrs. P. Duff, E. A. Kitzmiller, and R. P. Duff, assignees of Wesley Todd, dated October 5th, 1875, No. 6673, for an improvement in wash-boards, and the same is marked Complainants' Exhibit A, O. W. B., *N. P.*)

99 Int. 5. What opportunities have you had for becoming familiar with mechanics, patents, and the construction and operation of wash-boards?

Ans. I have for the last ten years made mechanics a study; I have also been engaged in the manufacture of wash-boards; have made them with my own hands, and have studied the subject of their manufacture thoroughly, not only as relating to the manufacture of wash-boards my firm has been manufacturing, but with reference to a great many other varieties. I have obtained one patent for my own invention, and have purchased two others.

Int. 6. Have you read the complainants' patent, Exhibit A, and are you familiar therewith?

Ans. I have read complainants' patent, and believe myself to be familiar with it.

Int. 7. Have you made or caused to be made a wash-board constructed in accordance with the specification and drawing of the patent, Exhibit A; and if so, will you produce it?

Ans. I have had one made, and now produce it.

(Wash-board produced by witness offered in evidence, and the same is marked Complainants' Exhibit B, O. W. B, *N. P.*)

Int. 8. What kind of a wash-board do you find described and shown in complainants' patent, Exhibit A, and claimed by the several claims thereof?

Ans. The board described in the complainants' patent is one having its frame made in the usual manner; that is, it is composed of side bars or rails, held in place by a back-board, placed between them, and a top rail, also a thin board nailed to the back at the upper end, so as to form a recess or soap-box. This frame-work is made of wood, and the side rails are grooved close to the back-board for receiving, covering, and holding the sides of the metal, which forms the acting face of the board when completed. The face or acting part of the board is made of sheet metal, sheet zinc being the metal used for that purpose. This zinc is corrugated or fluted in two directions, so as to produce small pro-
100 jections, bounded on all sides by depressions, so made that all the projections shall be rounded off, so as not to produce any sharp angles or points, which would be liable to injure any frabric rubbed thereon, however delicate its texture may be. These projections are arranged in lines, and a number of lines are made along the length of the zinc, forming a series of lined projections, covering the whole face of the zinc. The boundaries of those projections, as shown, are rectangular; or, as they are described, longitudinal and transverse; but this exact angle, or these exact lines, are not deemed to be essential, as they are varied as the zinc is varied, or its direction changed in passing through the machine by which it is crimped; and the only difference, when the board is completed, is in the angle presented after the zinc is fastened to its frame. The projections, whichever way the zinc is turned in the machine, are in a series of lines, cut across by transverse lines, forming the whole into an acting surface, which is composed of small raised projections, each bounded by grooves or depressions on their four sides. The board claimed in or by the first claim is one having its metal face covered with a series of projections, arranged in a series of lines running across it transve'sely, and cut across by grooves or depressions running lengthwise, forming depressed or grooved boundaries on all sides for each projection. The second claim includes all of the first, as I understand it, and in addition thereto cross-projections raised from below so as to connect, or partly connect, each projection with the succeeding ones, and thereby stiffen the zinc. The third claim is for a complete board, set in its frame and ready for use, as a new article of manufacture, the zinc or acting face having the peculiar ribs or corrugations made in sheet metal, and supported against a wooden back, and held in place by the side rails, as shown.

Int. 9. In what respects, if any, do you find the board, Exhibit C, to be like, or substantially like, the board described and claimed in the complainants' patent, Exhibit A? Please answer as to each claim, and give your reasons for any opinions you may express.

101 Ans. I find in Exhibit C the frame-work made in the usual way, having a rubbing surface made of sheet zinc, longitudinally and transversely grooved or corrugated at an angle of about $22\frac{1}{2}°$ from the top of the wash-board, forming raised projections of diamond shape, alternating along the line of the grooves or corrugations. I also find raised

projections in the bottoms of the grooves or corrugations. These raised projections are larger, or rather higher, than in Exhibit A, because the corrugations are deeper. I find the combination of the larger and smaller raised projections in Exhibit C substantially the same as in Exhibit A, except that the larger projections in Exhibit C are of diamond shape, while in Exhibit A are rectangular. The difference in the shape of the raised projections is caused merely by running the zinc through the crimping-rolls at different angles, and does not change the manufacture except in appearance. There is a manifest advantage, in my opinion, in crimping or corrugating the zinc, as shown in Exhibit A. The depressions formed allow of a more ready discharge of the water from under the clothes during the operation of rubbing, and the raised projections, being in a direct line with the action of rubbing as ordinarily done, do not have a tendency to spread the clothes in the hands of the operator, thereby straining and damaging them, as is the case where the zinc or face of the board is corrugated at other than direct lines with the action of rubbing, as is shown by Exhibit C. I cannot discover any material difference as shown by Exhibits A and C. They are evidently both made by the same kind of machinery, the difference in appearance being caused, as before stated, by the manipulation of the zinc during the crimping process. Exhibit C appears to have been crimped in this way to avoid the complainants' patent, and in so far as the lines are changed, I consider that the board has been injured; but in its poorer form it contains clearly, in my opinion, all the improvements described in the complainants' patent, and claimed in the three claims thereof. I have already given my reasons,

102 and to repeat them in brief I would say that I find the defendant's board to be the same as that shown and described in complainants' patent, because I find in such board a sheet-metal rubbing surface having a series of raised projections, which are each bounded on all sides by grooves or depressions, made by cross-crimping in lines, which are substantially longitudinal and transverse, in reference to each other, which is the substance of the first claim of the patent Exhibit A. I also find in the defendant's board projections raised from below, connecting the acting projections together in one direction, as shown in the patent Exhibit A, so as to stiffen the board and aid in keeping in place, or, in other words, to prevent the zinc from moving so as to crack it when under pressure in use. I find further that the combination of the larger and smaller projections, referred to above, and caused by cross-crimping, make up the defendant's board, when placed in its frame-work, as shown by Exhibit C, and therefore conclude that they are substantially one and the same thing for all purposes; or, in other words, the boards Exhibits B and C are substantially the same for all purposes.

Int. 10. You have stated that the crimps marked C, in the patent Exhibit A, are deeper or heavier in the defendant's board, Exhibit C, than they are shown in said patent; please explain how these boards are crimped, and what changes, if any, are required, in the process of manufacture to make them deep or shallow.

Ans. The sheets of zinc are crimped between two corrugated rollers. The upper roller is arranged with set-screws, so that the space between the rollers can be adjusted. If the rollers are adjusted close together the corrugations will be deep, and they will be shallower according to the

distance of separation. So far as the difference in the process of manufacturing is concerned, it is simply the difference of adjustment, or the turning of the set-screws.

EDWARD A. KITZMILLER.

In accordance with the request of the defendant's solicitor, by
103 letter, it is hereby stipulated that objections to the foregoing deposition, for relevancy, may be made at the hearing, with the same force and effect as though noted herein in due form and at the time.

O. W. BOND,
Notary Public.

Counsel for complainants offers in evidence original articles of agreement and license, by and between P. Duff & Sons and the Union Manufacturing Company, of Toledo, Ohio, and the same is marked Complainants' Exhibit D, O. W. B., *N. P.*

EDWARD A. KITZMILLER, recalled, deposes and says, in answer to interrogatories to him propounded by L. L. BOND, Esq., as follows:

Int. 11. The agreement and license to the Union Manufacturing Company appears upon its face to be territorially limited to less than the whole of the United States. Please say whether or not the limits of the license have been enlarged; and, if so, when and to what extent?

Ans. In the fall of 1875 the limits of Exhibit D were extended so as to include the whole of the United States. It was reduced to writing about two months ago, and, if desired, the new or amended agreement will be produced.

EDWARD A. KITZMILLER.

Depositions taken in the above-entitled cause, on behalf of complainants, by agreement of parties before me, at my office in the city of Toledo, Lucas County, State of Ohio, on this 2d day of May, A. D. 1877.

Present, complainants, by their attorney, Lester L. Bond, and the defendants, by their attorney, John G. Manahan.

FRANK MILLWARD, being produced, sworn, and examined, testifies as follows:

Ques. 1. What is your name, age, place of residence, and occupation?

Ans. My name is Frank Millward; age, 43 years; I reside in Ludlow, Kentucky, and am engaged in business in Cincinnati, as a solicitor of patents and mechanical engineer.

104 Ques. 2. What opportunities have you had for becoming familiar with mechanical devices, patents; and what, if any, have you had in reference to washing devices and wash-boards?

Ans. For twenty-seven years and over I have been wholly engaged in mechanical occupations, successively as engineer's apprentice, practical machinist, practical machine draughtsman, master mechanic, in charge of manufacturies for the construction of machinery, and as solicitor for the preparation of applications for patents for various mechanical devices, during which time I have become familiarized with the principles of mechanism, and the application thereof to the construction of machines. I

am almost daily called upon to examine and compare mechanical devices, and to very frequently testify in the circuit court of the United States as an expert in patent cases. I have made many drawings of improvements in washing machinery and appliances, and have had under my charge such devices for the purposes of practical test to determine relative merits.

Ques. 3. Have you read and are you familiar with the complainants' reissue patent number 6673, marked Complainants' Exhibit A?

Ans. I have; and believe I understand the same.

Ques. 4. Have you examined the defendant's patent, exhibits marked from 3 to 9, inclusive?

Ans. I have.

Ques. 5. Please state to what extent, if any, you find the improvements described in the complainants' patent anticipated in substance or in part by either of said defendant's exhibits. In your answer please take them according to their numbers, and give your reasons for any opinions you may express.

Ans. In order that my answer may be perfectly intelligible, in comparing the improvement shown and described in complainants' Exhibit A with each of the exhibits to which my attention is now called, I shall have to state what I understand to be the improvements specified in said
105 patent Exhibit A. I have carefully read the patent, and find that it relates to improvements in the class of wash-board in which the rubbing face is composed of sheet metal, which is crimped or corrugated, or, in other words, shaped into folds or wrinkles, to present a proper rubbing surface. It has been customary, and, I may say, universal, in the manufacture of these corrugated sheet-metal wash-boards, to form the corrugations, folds, or wrinkles so that they all run in the same direction, which was cross-wise of the wash-board. In the improvements of Todd, specified in said patent Exhibit A, he retains all the advantages incident to the use of crimped or corrugated sheet metal, and so changes the rubbing surface as that, in place of having corrugations running all in one direction, he crosses them by corrugations or folds running in lines transversely thereto. It is the formation of a plate by such intersecting folds or corrugations which I understand to be the improvement referred to in the first claim, and it is the complete wash-board as an article of manufacture, having a rubbing face formed by intersecting corrugations in sheet metal, which I understand to be the improvement specified in the 3d claim; and as to the second claim, I understand it to be for such a formation of the intersecting corrugations as that ribs or projections appear, marked C in the patent, rising above the bottom of the depressions in the rubbing face. In comparing these improvements with the device shown in defendant's Exhibit 3, Witsel patent, I am clearly of the opinion that said Exhibit 3 does not embrace several improvements specified respectively in the first, second, and third claims of the patent Exhibit A, for the reasons that it is not, in the first place, a sheet-metal wash-board; in the second place, that it has no corrugations or folds intersecting each other, as the corrugations or folds of Exhibit A are required to do, and it is not adapted to perform the same office in the same way as the sheet-metal wash-board shown and described in Exhibit A. It is simply a wooden wash-board with cups turned in its rubbing face, each surrounded by angular grooves.

106 With reference to defendant's Exhibit number 4, Beidler's patent,

I find that the rubbing face of this is made up in Figure 1 of the old form of corrugated sheet-metal board; that is, the corrugations running all one way, and having a series of holes punched through the metal at bottom of the channels formed by the corrugations to let the water through. And the rubbing face of the one shown in Figure 2 is simply a wire screen for the same purpose. This Exhibit number 4 does not, in my opinion, embrace either of the improvements specified in the first, second, and third claims of patent Exhibit A, as it is not a wash-board having a rubbing face formed by intersecting crimps or corrugations in sheet metal. This form of board, moreover, as shown in Exhibit 4, is very defective in durability, for the reason that its surface is broken through and weakened by the holes, in place of being continuous and unbroken, as is the sheet-metal plate shown in Exhibit A.

As to the device shown in the Keech patent, defendant's Exhibit 5, I would state that it is simply a wash-board with a rubbing face formed by a corrugated zinc plate, with the corrugations running all one way, crosswise, but in a zigzag or rail-fence style. These corrugations are not crossed or intersected by corrugations or crimps running transversely thereto, which is required to be the case in formation of the wash-board shown in Exhibit A, and for this reason I am of the opinion that defendant's Exhibit number 5 does not embrace either of the improvements specified in the first, second, and third claims of patent Exhibit A. With reference to the Bellus & Bower's patent, Exhibit 6, I find that its rubbing face is composed of a sheet of metal in which there are no corrugations or crimps in either direction, but the plate is perforated at intervals, and spherical-headed nails are driven in so that the face is composed of a flat plate of metal, with semi-sp'erical prominences at intervals over its face. Owing to the fact that this is not a wash-board having a rubbing face formed by sheet metal fluted, crimped, or corrugated in two directions, as the
107 patent Exhibit A requires, it cannot be said that this Exhibit number 6 embraces either improvement specified in the first, second, or third claims of patent Exhibit A.

With reference to the device shown in the Crihfield patent, defendant's Exhibit 7, and in the certified model, defendant's Exhibit 8, I find that it is a wash-board having a sheet-metal face, which, in place of being crimped or corrugated, as shown in complainants' patent Exhibit A, is provided with a series of prominences, forced up necessarily by the well known process of stamping by dies. This process is entirely different from that known as crimping or corrugating, as usually practiced, and requires a different manner of manipulation, as, for example, the sheet-metal rubbing face shown in Exhibit A is made, or can be made, with its crimps in both directions, formed by the simple act of rolling through crimping rolls, while the plate shown in Exhibit numbers 7 and 8 must be made by submitting the plate to the action of a pair of dies, the feeding of the plate being such that rows of prominences must be made by successive blows, to lessen the danger of breaking the metal. Owing to the fact that the wash-board shown by these Exhibits 7 and 8 is not one whose face is formed by intersecting crimps or corrugations, I am of the opinion, clearly, that it does not embrace the improvements specified in the first, second, and third claims of patent Exhibit A.

(Defendant objects to so much of the above answer in relation to Exhibits

7 and 8 as refers to the method of the manufacture of the board therein described, as compared with the process of manufacture of complainants' board, for the reason that the claims of the latter are not for a process, but for a finished article of manufacture.)

Ques. 6. In your answer with reference to Exhibit 9, please include the Patent Office model of said patent, defendant's Exhibit 10.

Ans. With reference, then, to the device shown in the Galusha & Safford patent, defendant's Exhibit 9, and also shown in the certified model, defendant's Exhibit 10, I find that there is a degree of indefiniteness about the description which renders it difficult to understand. The
108 specification states that "sheet zinc will probably be used for the part B, at least this would be the most desirable material." It is difficult for me to understand how sheet zinc could be forced by any of the well known processes for shaping metals into the form shown by the drawing and model, without the breaking of the zinc at every depression, as it is a metal having but little ductility; and, I find that in the model Exhibit number 10 zinc has not been used for its formation, but soft brass, afterwards tinned. But irrespective of this apparent impracticability of formation in the way the patent describes, I find that the Exhibits 9 and 10 do not illustrate a wash-board whose rubbing face is formed of sheet metal crimped in two directions, as the patent Exhibit A requires, but illustrates a plate of metal designed to be punched up into a number of hills or prominences with dies. I do not see any resemblance in the principle of construction between a plate formed in this way, with a succession of prominences, and the plate shown in the patent Exhibit A, formed by crimping or corrugating in intersecting lines, as shown in said patent; and I do not think, therefore, that these Exhibits 9 and 10 embrace the improvements specified in the first, second, and third claims of Exhibit A, but am clearly of the opinion that they do not.

Ques. 7. In reference to the defendant's Exhibits 8 and 10, how do you find the knobs or protuberances bounded, as compared with the projections on the board described in complainants' patent?

(Same objection interposed as to the answer to interrogatory number 5. This objection is interposed to the answer to interrogatory number 6.)

Ans. The projections described in complainants' patent are formed by lines running in two directions, so as to cross or intersect the double series of lines, being formed by grooves or depressions, while the plates shown in Exhibits 8 and 10 have prominences or protuberances bounded by the original base of the plate, so as to form valleys extending completely around each protuberance.

109 Ques. 8. Please look at defendant's Exhibit 11 and 12, and say what, if anything, you find therein, or thereby shown or described, anticipating, in substance or in part, the invention described in complainants' patent; also what, if anything, you find in said exhibits suggestive of the complainants' improvements.

Ans. I find nothing in defendant's Exhibits 11 and 12 which is substantially the same as either of the improvements specified in the first, second, and third claims of complainants' patent Exhibit A. These two exhibits show a wash-board having a rubbing face, that is, a face on which the clothes rest and move, composed of a series of rollers turned into beads and grooves, and lying close together, so that the beads of one roller fit

into the grooves of the next. This is the wash-board, and in place of allowing the operator to grasp the clothes, the inventor provides a gripper or holder above the wash-board, by which the clothes are held and moved. The under side of this holder, which is a block of wood, is grooved in the direction of motion, and it has smaller grooves crossing these; and the patent states that these latter groves, marked *c*, are for carrying or moving the clothes along over the rolls, and preventing them from lying in one place, or for holding them against the rollers. There is no part of this patent which either shows or describes the wash-board whose rubbing face is composed of sheet metal fluted, crimped, or corrugated in intersecting lines, and for this reason I am of the opinion that these Exhibits 11 and 12 do not embrace the improvements specified in the patent Exhibit A, and summed up in the three claims thereof. And as to the second part of the question, I am of the opinion that the rubber board, C, of Exhibit 11, would not suggest to a constructor the doubly corrugated wash-board shown in Exhibit A any more than the looking at the surface of an ordinary cast-iron waffle-iron would suggest the construction shown in Exhibit A.

Ques. 9. Have you examined, and are you familiar with the devices shown and described in the following patents exhibited by defend-
110 ant, to wit, patent number 14111, January 15th, 1856, to Ira S. Parker; patent 14638, April 8th, 1856, to Royal Hatch; patent 22667, Jan. 18th, 1859, to John K. O'Neil; patent 32994, August 6th, 1861, to Warren Hill; patent 33118, August 20, 1861, to Geo. Whitford; patent 11426, August 1st, 1854, to Joseph Hyde; patent 34046, January 7th, 1862, to S. J. Babbit; patent 47206, April 11th, 1865, to Nelson Homes; patent 33511, October 22d, 1861, to A. P. Barlow; patent 39343, July 28th, 1863, to A. Hall; patent 36568, September 30, 1862, to G. H. Kidney? If so, please state whether or not you find in any or either of said patents wash-boards shown or described which are, in your opinion, the same or substantially the same as the improvements described and claimed in complainants' patent.

Ans. I have carefully examined all of the exhibits referred to in the question, and do not find in any one of them the improvements, or either of them, specified in the three claims of patent Exhibit A. None of the exhibits referred to in the question have any substantial resemblance to the doubly corrugated sheet-metal wash-board, specified in Exhibit A, and in fact, not one of them shows even a sheet-metal wash-board. Most of them are wooden roller surfaces. One is an India-rubber wash-board, having elevated ribs, crossed by ribs of the same height; and another is apparently a cast-iron washing plate, adapted to form both front and back, with a front having hemispherical knuckles or projections thereon, apparently formed on the casting or rigid plate.

Ques. 10. Have you made, or had made, any experiments in reference to double crimping wash-board zincs, and the direction of the lines of crimping; if so, please state what those experiments were, what direction of crimping lines were used, and if you have any of the boards or zincs made, please produce and exhibit them.

Ans. In comparing the defendant's wash-board with the wash-board shown in Exhibit A, I found, as I have stated, that the one shown in the patent was made by crimping and cross-crimping a sheet-metal plate, and

that in the one shown in the patent, the crimps were drawn at right
111 angles to each other. The defendant's wash-boards, I found, were crimped by double crimps intersecting each other at a different angle to a right angle; and, in order to be able to speak with greater accuracy, in comparing the two boards I was desirous of testing practically the effect upon the metal of feeding at different angles through the crimping machine, and I was also desirous of seeing the operation of crimping, to be able to speak positively as to the appliances required for the production of the board shown in Exhibit A.

So I had experiments made at the Union Manufacturing Company's works, in which I had wash-boards completed with the rubbing-face made by crimps and cross crimps, arranged at right angles to each other, and others with the rubbing-face crimped and cross crimped not at right angles. The machine which corrugated the plates was the same, and it was only capable of crimping a sheet-metal plate by grooving or wrinkling it in parallel lines; and the cross grooves were made in the same pair of rolls which formed the original set of corrugations. In corrugating, like the defendant's plate, I also tried the effect of making the cross crimps shallower than the original crimps, so as to be able to define more accurately the presence, in plates like the defendant's, of the projections marked *c* in Exhibit A. The exhibits I now mark F. M., 1 and 2, and the exhibits marked F. M., 3, are the wash-boards I had made with the double crimps at angles, like the angles of the crimps in defendant's wash-boards. In Exhibit F. M., No. 1, the cross crimps are very shallow, but they clearly show not only the grooves across the ridges of the original crimps, in accordance with the provisions of the 1st and 3d claims of Exhibit A, but the upward projections from the bottom of the depressions of the original corrugations, corresponding with the projections marked C, in Exhibit A, and referred to in the second claim. The Exhibit F. M., No. 2, is the same thing, with the cross crimps a little deeper, and Exhibit F. M., No. 3, is the same thing, with the cross crimps as deep, or nearly so, as the original crimps. The only difference made in the appliance for
112 making these plates was in adjusting the upper roll of the crimping machine so that the metal, in passing through there, was more or less crimped crosswise. The same manufactory is adopted, without change of machinery, to manufacture plates like Exhibits F. M., 1, 2, and 3, or wash-board plates with the crimps at right angles to each other, as shown in Exhibit A, and I am of opinion that there is no difference between them in principle of construction or mode of operation, both having the same characteristic, to wit: Crimps crossed by other crimps, adapted to give a very effective rubbing-surface in washing, by reason of the multiplicity of angles, and free escape, by reason of the cross grooves, for the dirty water. There may be some little difference in degree of efficiency, the difference being, I think, in favor of the exact arrangement of angles shown in Exhibit A.

The last foregoing question and answer are objected to by defendant's counsel, so far as it refers to "the process of crimping," for two reasons. First, complainant's patent is not for a process; and second, complainants went over that subject-matter of methods of crimping in their prima facie case—see evidence of Mr. Kitzmiller.

Ques. 11. Please look at the board marked Complainants' Exhibit B, and Defendant's Exhibit, 1, and say whether or not you find longitudinal

grooves in said boards, and, if so, what office or effect they have in the operation of washing?

Ans. I do find that each board has, in addition to the cross grooves, a series of longitudinal grooves. The office they perform is to greatly multiply the number of angles against which the clothes rub in operation, and to stiffen the plate, and to provide for the free discharge of dirty water from groove to groove between the rubbing angles, and all this is done by cross grooving, or, in other words, cross fluting or crimping, which is the same kind of operation as that which forms the original crimps.

113 Ques. 12. Please look at the wash-board, Defendant's Exhibit, 2, and state to what extent said board resembles the complainants' board, Exhibits B and 1, and to what extent they differ, in your opinion.

Ans. It differs very materially or substantially from Exhibits 1 and B, for the reason that in Exhibit 2 there are simply the old-fashioned crimps, in one direction, with no crimps arranged transversely thereto.

Ques. 13. To what extent, if any, does the defendant's board, Exhibit C, differ, in appearance, from the common board, Exhibit 2, and from the complainants' board, Exhibits B and 1? and if you shall say that the defendant's board differs in appearance from complainants', state whether or not in your opinion, such difference is substantial or material.

Ans. There is a very great difference, in appearance, between the Complainants' Exhibit C (defendant's board) and Defendant's Exhibit, 2; and there is a substantial difference between them, as is obvious, in construction and operation. There is but little difference in the appearance between Complainants' Exhibit C, Complainants' Exhibit B, and Defendant's Exhibit 1; and there is no substantial difference in their principle of construction, mode of operation, or adaption for use, for the reason that Exhibit C has a wash-board plate with projections formed or bounded by corrugations or crimps in one direction, crossed by crimps running transversely thereto; and it is a wash-board having in the grooves or depressions projections upward like those presented in Exhibits B and 1; and it is a complete article of manufacture as a wash-board, which, like Complainants' Exhibit B and Defendant's Exhibit No. 1, has a rubbing face with double sets of corrugations, crimps, or grooves which may be regarded as longitudinal and transverse or cross. The difference between Exhibit C and either of the Exhibits B or 1 is one of appearance only, and this is but little; and it is a difference which is not one of substance or materiality, as I think is obvious, in principle of construction and mode of operation. It is simply a manufacturer's variation, not affecting the

114 substance or value due to the sheet-metal rubbing-face having crimps in the metal in one direction, crossed by crimps in the metal transverse thereto.

Ques. 14. Please compare complainants' board, Defendant's Exhibit 1, and the defendant's board, Complainants' Exhibit C, and say which of said boards presents the greater amount of rubbing surface brought into action in washing, and if you shall find that there is a difference in this respect, state in which board you find the greatest amount, and give your reasons for any opinion you may express.

Ans. The question of rubbing surface is one effected by the angle of presentation of the rubbing surface to the direction of the motion of the

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hands of the operator, so that it can be easily seen that one surface, although less in length than another, may be equally effective. In the character of rubbing surface presented, in the two exhibits referred to in the question, the fairest way of computing the rubbing surface is by counting the number of prominences in each, and the one having the greatest number of prominences will have the greatest amount of effective rubbing surface. In this case the number is the same in each. It is of course best that the prominences should present one side broadside to the direction of the motion of the hand, and for this reason Defendant's Exhibit, 1, would be more effective in operation than Complainants' Exhibit C.

Ques. 15. You have stated that one office of the cross or second crimping was to stiffen the plate which forms the rubbing surface. Please explain how they have that effect, and whether or not, in your opinion, that effect or result is material, or of substance.

Ans. The cross crimps have the effect of breaking up the continuity of the lines formed by the crowns of the original crimps, and in operation the surfaces most prominent will be worn through first, and in boards crimped in two directions the metal may be worn almost entirely through on the prominent lines without causing the plates to rip across. This materially effects the life of the board, and is a matter of substance.

115 Ques. 16. While speaking in reference to the older patents exhibited by the defendants, and of the complainants' and defendant's board you have stated that the former were manufactured, if made at all, by the stamping process, and the latter by the crimping process. Please state whether these processes are regarded in the arts as the same, or different processes, and whether or not there is any difference in effect upon sheet metal when one or the other is used, and if you say that there is a difference in effect, please state what that difference is.

Ans. They are recognized generally as different processes. One can very rarely, if ever, produce the same effect as the other. The difference in effect is, that in one the metal is folded or bent to form, and in the other is stretched or extended to form, unless it is a simple act of compression by stamping. In making zinc plates to form, this metal will easily stand crimp or bending by rolls, but cannot be worked safely in the stretching process of stamping.

Cross-examination by Mr. MANAHAN:

Cr.-ques. 1. State whether in Defendant's Exhibit 2 you recognize the ordinary corrugated zinc wash-board, mentioned by you in one of your answers in chief?

Ans. I answer, yes. In other words, the wash-board having the ordinary zinc plate crimped in one direction. The peculiar formation of the grooves in the sides of the frame which receive the zinc is, I think, unusual.

Cr.-ques. 2. In what direction is such zinc surface crimped in relation to the general frame of the wash-board?

Ans. At right angles to the sides of the frame.

Cr.-ques. 3. Do you find this feature involved in complainants' board?

Ans. I don't quite understand the question. If the question means, must the first crimps shown in complainants' patent always be at right angles to the sides of the frame, I say no; but there must be, of course,

one set which may be called longitudinal, crossed by another set transversely thereto.

116 Cr.-ques. 4: The question is repeated, with the explanation that it is the intention to enquire whether in complainant's board, and in the drawings making part of their letters patent, there is, in fact, a series of parallel corrugations, extending across the rubbing surface, at right angles with the sides of the frame, and, if so, whether such board is not, to that extent, a counterpart of the old board referred to.

Ans. The combined or double sets of corrugations shown in the patent, and which intersecting corrugations are the essence or essential features of the patent, are shown in the drawings, so arranged that one set of corrugations extend from side to side of the wash-board, at right angles to said sides; and if there were no other corrugations but these, of course the board would be no different from the old board, substantially.

Cr.-ques. 5. Do you find in defendant's board corrugations having the same direction relative to the board as those in the old board referred to?

Ans. No; this is the variation I before referred to. I find, of course, a double set of corrugations, with one set extending from side to side of the board; not directly across, but anglewise, and another set of corrugations or crimps crossing the first transversely.

Cr.-ques. 7. Then I understand you that defendant's board has nothing identically in common with said old board, while complainants' has one series of corrugations substantially or identically the same as the old board, reference being had to the rubbing surface alone of the respective boards.

Ans. They both have something in common with the old board. Both the complainants' board and the defendant's board take up the essence or substance of the old board; that is, the sheet-metal plate, fluted or crimped or corrugated in one direction; but neither of them stop there; they both go further, and make, in addition thereto, another set of crimps of the same kind across the first set; and this is the material similarity between the defendant's and complainants' boards; but, as the question intimates,

117 the inventor of the device shown in complainants' patent, in taking up what there was of the old board does not vary the angle, while the defendant does vary it before he makes his second set of crimps. So that, as to the first set of crimps, the complainants' is the same as the old board in substance, and identical in angle, while the defendant's is the same in substance as the old board as to the first set of crimps, but varied, and, therefore, not identical in angle.

Cr.-ques. 8. Would it be practicable, in your judgment, to cross crimp at or near right angles, a series of crimps running directly across the board, so as to present as a rubbing surface more than one side of the interlined projections.

Ans. If the line of motion of the operator's hands was always parallel with the sides of the board, he would be opposed, of course, by only one side of the projection, but the end angles, of course, of each projection would be very effective rubbing surfaces. In operation, however, the hands of the operator move in an angle, in relation to the sides of the board, and not parallel thereto, so as to converge towards the bottom end of the board, so that, in point of fact, if the board is crimped at right angles, and arranged with one set parallel to the sides, as the question indi-

cates, I presume the clothes will be forced not only against the projections almost broadside, but against the ends thereof.

Cr.-ques. 9. Look upon Defendant's Exhibit 1, and upon the drawing forming part of complainants' patent, and state whether the rubbing surface shown in both cases are identical.

Ans. They are the same in substance, but not identical. The patent shows the last set of corrugations indented down to the middle of the depth of the original corrugations, and the upper projections, marked C, rising to half the height of the original projections. Defendant's Exhibit No. 1, is not crimped, with its second set of crimps, as deep as the patent shows.

Cr.-ques. 10. In speaking of corrugations and grooves, in your examination in chief, in relation to complainant's board, state whether you refer to such on the front or rubbing surface.

118 Ans. Not exactly; by the word corrugation I mean a crimp, fold, or wrinkle in the metal, and its formation effects both sides alike.

Cr.-ques. 11. Do you find either in said drawings of complainants', or said Exhibit 1, corrugations traversing or crossing corrugations, or grooves traversing or crossing grooves?

Ans. Yes. The word corrugation presupposes both a ridge and a groove. In the patent drawing, and in said Exhibit 1, I find that the grooves formed by the original set of corrugations are crossed by the grooves marked small *a* in the patent, and the ridges or elevations formed by the original corrugations are crossed by the elevated portions marked C in the patent.

Cr.-ques. 12. You mean to be understood that projections marked C, in the interlying valleys, cross the series of ridges, which constituted, with said valleys, the front first surface?

Ans. Yes; in the same way that a fence may cross a stream, and also cross fences, one each side of the stream. I do not mean to say that the ridges or projections marked C, in crossing or intersecting the original ridges, rise to the same height, for they don't.

Cr.-ques. 13. Do you mean to say that there is any indication on the apices of the ridges of said drawing or said board to evidence a longitudinal rib or corrugation?

Ans. No. The ribs referred to crosses below that point.

Cr.-ques. 14. Should you look upon the reverse surface, would you find any indication of the rib referred to, opposite that point?

Ans. No; for the reason that when reversed each ridge becomes a groove, and each groove a ridge.

Cr.-ques. 15. Then is it not true, as a matter of fact, that, in reference to each side of said metal sheet taken separately, no groove crosses a groove, and no corrugation crosses a corrugation?

Ans. Both sides of the sheet are of course the same, and a reference to one is a reference to the other. The statement, in question, is not correct

119 from my standpoint. The channels originally formed in the plate by the first series of corrugations, are crossed by the channels marked small *a*, in the same way that one trough may be crossed by another trough, or one furrow by another furrow; and so with the elevations, one ridge crosses another ridge, in the same way that a fence crosses a fence. The question may be regarded differently from a different standpoint. It

may be quite as true to state that in Exhibit 1 each small groove crosses a ridge and not a channel, and each small projection crosses a channel and not a ridge.

Cr.-ques. 16. In what lines, in your judgment, are the series of raised projections, claimed in the first claim of complainants' patent?

Ans. The exact lines, in my judgment, are immaterial. As a matter of description the patent, of course, has to describe the lines of the corrugations relatively, and it calls one longitudinal and the other transverse, and in the drawing the projections are shown, arranged with their length directly across the board. Each elevation originally formed by the first set of corrugations is crossed by small channels, which make a number of projections in each ridge; and, as shown in the drawing, when the sheet is finished the projections are in check rows, as it were, making rows in each direction, longitudinal and transverse.

Cr.-ques. 17. That being the case, is there any difference in identity between the projections mentioned in the first claim and the ribs or corrugations mentioned in the third claim?

Ans. No; I am of the opinion that neither claim depends upon the exact lines of direction of the crimps, which form what are called the corrugation, and the projections in the first claim, are, of course, formed by the same channels, which, in connection with the ridges, form the corrugations referred to in the third claim.

Cr.-ques. 18. The question is, more particularly, whether the pro-
120 jections of the first claim, with their outlying grooves, taken aggregately, do not constitute the same surface claimed in the third claim?

Ans. As to the plate alone, without reference to the frame, which latter makes it a complete article of manufacture, I have been unable to discover any difference between the sheet-metal rubbing surface referred to in the first claim, and the rubbing surface included in the article of manufacture, covered by the third claim.

Cr.-ques. 19. In your reference to the Galusha and Safford board, and also the Crihfield board, you have differentiated those from complainants', in part, from their having projections raised above the plane of the original plate, while you describe complainants' projections as alternated with interlying grooves. Logically or mechanically, what difference is there, in a sheet-metal board, between projections formed by being forced up from the general level, and projections created by depressing, in part, the interlying material, so long as the projections themselves, in both cases, are generically the same?

Ans. There is a difference mechanically in the adaptation for manufacture, in the first place, one being adapted for manufacture by the simple process of crimping in two directions by crimping rollers, and the other being adapted only for manufacture by the stamping process. Then there is a clear mechanical difference between the two, when made. In the complainants' and defendant's boards, produced by the simple act of crimping and cross-crimping, there are a much greater number of effective projections produced than is possible to be produced in a board made like the Galusha and Safford or the Crihfield board. I mean, of course, projections of the same extent in each, from the hollow to the crown.

Cr.-ques. 20. Is it not true that the corrugations and grooves in defend-

ant's and the old style board are all formed by forcing one-half of the zinc above the original plane, and one-half a corresponding depth below the original plane?

Ans. I presume this is about correct, though it is hard to say where the original plane was, in relation to the position of the crimps, when the plate is finished.

121 Cr.-ques. 21. Do you understand the claim of the complainants, in their said patent to be for a process or for a finished result?

Ans. Not for a process, but for a certain peculiar construction of the article.

FRANK MILLWARD.

LA FAYETTE LYTTLE, of lawful age, being produced, sworn, and examined, testified as follows:

Ques. 1. State your name, age, place of residence, and occupation.

Ans. My name is La Fayette Lyttle; age 46 years; I reside in the city of Toledo, Ohio; am a manufacturer, connected with the Union Manufacturing Company, of said city.

Ques. 2. In your connection with the Union Manufacturing Company, what department or branch of the business has been under your charge or connection since August, A. D. 1872, or since the company commenced the manufacture of wash-boards under the Todd patent?

Ans. Up to the 1st of January, 1874, I was secretary and treasurer of said company, and from that time to January, 1875, I was treasurer. Ever since April, 1875, I have been the traveling agent of said company, which position I now hold.

Ques. 3. What efforts have the company made to establish a market for the class of board manufactured by you, and what success has it had in that direction?

Ans. We have had traveling agents out nearly all the time since we commenced the manufacture of this board, who have solicited orders as far west as Omaha and Kansas City, and as far east as Boston, and south to Louisville. We also exhibited the board at the Centennial Exhibition, and from that exhibition made several foreign shipments. The company is now filling an order from Dublin, Ireland, for 120 dozens of these boards. Our sales have been constantly increasing from the time we commenced manufacturing the board until the present time.

Ques. 4. When did you first meet with competition in the sale of double or cross crimped wash-boards, what kind of competition, and from what sources?

122 Ans. I first met with competition in February, A. D. 1876, on a western trip. The next time I met with it was in April, 1876, on my next trip. This competition was from a board of similar appearance to our patented board, which they were selling at a less price. The first board that I met was manufactured in Muscatine, Iowa; at first they were not branded at all, but afterwards they were branded "The World," which I supposed to be in imitation of our own, which were branded "Globe." It was manufactured by Brent Brothers. The next board I met is known in the market as the "Sterling board." The World board they soon stopped making, the reason, I suppose, of an injunction against J. F. and J. E. White, wooden ware dealers in Chicago, Ill. The Sterling

board is still manufactured, and I have no doubt they are injuring our sales largely. The Sterling board is being offered in the market as an improvement on our board, and at a less price. Within the last year some three or four others have come to our knowledge, as manufacturing a board similar in appearance to ours. There is one manufactured, in a small way, in Springfield, Ill.; one in Cleveland, Ohio; and two in Norwalk, Ohio.

(Defendant's counsel objects to the foregoing testimony of La Fayette Lyttle generally.)

Cross-examined:

Cr.-ques. 1. Do you know of a wash-board manufactured under the A. R. Crihfield patent? If yea, state where and by whom?

Ans. I do. It is manufactured by the Udell Ladder and Wooden Ware Company, of Indianapolis, Indiana. It is made under that patent, but not in accordance with the patent.

Redirect examination:

Ques. 1. Is the Crihfield board, as modified and manufactured by Udell Company, a double or single crimp board?

Ans. In my judgment it is neither. It is not a crimped, but a pressed board, being irregular lumps, raised up by pressure, from a plain surface.

123 Ques. 2. Was this one of the boards referred to by you in your last answer in chief?

Ans. It was not.

Ques. 3. Do you know of any other company or party making or attempting, or having attempted to make wash-boards under the Crihfield patent?

Ans. I know of no other company making them at the present time; but our company manufactured them for about a year previous to Udell Company's making them, but finding them unsatisfactory to the trade, we abandoned them.

(Defendant objects to the redirect generally.)

LA FAYETTE LYTTLE.

EDWARD A. KITZMILLER, of lawful age, being produced, sworn, and examined, testified as follows:

Int. 1. Are you the same Edward Kitzmiller that has heretofore testified in this cause?

Ans. I am.

Int. 2. Did you at any time manufacture wash-boards under the Todd patent, Complainants' Exhibit A? If so, when did you commence, what efforts did you or the firm of which you are or were a member, in introducing such boards; when did you cease manufacturing, and how many boards did you dispose of up to that time?

Ans. As a firm we did manufacture wash-boards under the Todd patent, Complainants' Exhibit A. We commenced the manufacture of said boards on or about the 1st day of August, 1871, and used every effort to introduce them to the trade. We ceased manufacturing the said wash-boards on or about the 1st day of August, 1872, and during the time aforementioned we made thirteen hundred and eighty-four (1,384) dozens. By the firm I mean P. Duff & Sons, complainants in this suit.

Int. 3. Have you procured any wash-boards that have been in use; if so, please produce and exhibit them, and say for what purpose you have procured them, and what each exhibit is?

Ans. I have procured two boards and parts of two other boards,
124 which I now produce, and request the same to be marked E. A. K., 1, 2, 3, and 4, respectively. Exhibit E. A. K. 1 is the zinc portion or rubbing surface of a single or plain crimped wash-board. Exhibit E. A. K. 2 is the zinc portion or rubbing surface from another board of the same kind as 1. Exhibit E. A. K. 3 is a complete wash-board, plain or single crimped, having the same rubbing surface as Exhibits E. A. K. 1 and 2. I have procured these boards for the purpose of showing how and when such boards give way in use, and to show the effect cross crimping has in giving life to the board. These boards show that by use they break at the angles above and below, or at the top and bottom of each ridge or rib. Exhibit E. A. K. 4 is one of the wash-boards Messrs. P. Duff & Sons, complainants, manufactured under the Todd patent, in the year 1871. I have procured this for the purpose of showing the wearing qualities of these wash-boards, it having been in constant use from the time it was made, in 1871, up to April 16th, 1877, over five years; and for the purpose of showing that the cross-crimps give strength to the rubbing surface preventing the ridges or ribs from breaking, as is the case in those without the cross-crimps; and also to show that even when one of the raised projections are broken out by accident, as is the case in the said Exhibit E. A. K. 4 the board is not destroyed, but the cross crimping prevents the break from extending along the line of the ridge or rib.

Int. 4. What, or about what, is the average life of wash-boards like your Exhibits 1, 2, 3?

Ans. That depends somewhat on the amount of use and the care taken of the board. Some only last a few months, others a year, while some may, with great care, last even two years; but I should judge the average life of a plain crimped board to be about one year.

Int. 5. So far as your knowledge extends in regard to the boards manufactured by your firm in 1871, what, or about what, is the average life of boards made under the Todd patent, or cross-crimped boards?

125 Ans. As far as I know they are all still in use. I have never yet seen one of them worn out or unfit for use. The Exhibit 4 I have produced is the nearest worn out I have been able to find, and it was injured by an accident in moving, and is still a good wash-board.

Int. 6. Do you know John S. Lash, the patentee of the patent No. 49635, dated August 29th, 1865, and have you had any correspondence with him?

Ans. I don't know Mr. Lash personally, but I have had some correspondence with him.

Int. 7. Have you such correspondence with you, or copies thereof; if so, will you please produce the same and exhibit them herein?

Ans. I have such correspondence, and produce the same, and mark them Exhibits E. A. K. 5 and 6, respectively. Exhibit 5 is a letter-press copy of a letter sent to John S. Lash at the time named in it. Exhibit 6 is the original reply of Lash to said letter, Exhibit 5. The time named in said Exhibit 5 is October 16th, 1876. A part of the figures of the date, being printed on the letter sheet, did not copy.

(The introduction of the above correspondence is objected to by defendant's counsel generally, and that part of the above testimony alluding to the duration of common wash-boards.)

Cross-examination waived.

EDWARD A. KITZMILLER.

WILLIAM O. DAKIN, of lawful age, being produced, sworn, and examined, testifies as follows:

Ques. 1. What is your name, age, residence, and occupation?

Ans. William O. Dakin; thirty-four; Toledo, Ohio; secretary Union M'f'g Co.

Ques. 2. Who has charge of the sales books of said company?

Ans. I have charge of the books; the secretary is the bookkeeper.

Ques. 3. Have you, at my request, examined said books, so as to be able to state the number of boards manufactured and sold by your
126 company under the Todd patent? If so, please state when the company commenced manufacturing said boards and the number made and sold up to the 1st of April last?

Ans. Yes. The company commenced manufacturing about the 17th day of August, 1872. The total number made and sold was one million two hundred and seventy-eight thousand two hundred and sixteen (1,278,216). The company has made small boards, called ruffle-boards, which I did not include in the statement. There were about six hundred dozen of these, amounting to about seven thousand two hundred more.

Ques. 4. How, or about how, has the business averaged since the company commenced manufacturing these boards?

Ans. The year 1872, from August 17th to December 31st, inclusive, there were sold twenty thousand two hundred and forty-one (20,241). For the full year 1873 there were sold 61,879; for the year 1874, 241,404; for the year 1875, 439,490; for the year 1876, 515,200. For the first quarter of this year there were sold 114,534, being an increase over the first quarter of 1876, 16,618. The first quarter is always the poorest of any quarter of the year for sales.

Ques. 5. When did the company first meet with competition in the market in double-crimped wash-boards?

Ans. To the best of my knowledge some time in February, 1876; this was about the time our customers commenced complaining about other boards and asking for reduced prices on account of competitors offering other boards at less price.

(The above testimony objected to generally by defendant's counsel.)

Cross-examination by J. G. MANAHAN, Esq.:

Cr.-ques. 1. Whose manufacture, if you know, interfered with your sales as above stated?

127 Ans. I don't know that there was any manufacture named; the boards referred to were stated to be a similar board to the double-crimp that we were manufacturing.

Cr.-ques. 2. During the years above referred to by you was your company engaged in the making of ordinary wash-boards?

Ans. Yes, sir.

Cr.-ques. 3. What amount of those have you sold during the same time?

Ans. I am not prepared to answer that without referring to the books.
Cr.-ques. 4. Could you state whether more or less than the other boards?
Ans. I could not.

WILLIAM O. DAKIN.

ROBERT S. JANNEY, of lawful age, being duly sworn, deposes and says as follows:

Ques. 1. What is your name, age, residence, and occupation?

Ans. Robert S. Janney; age, 47; Toledo, Ohio; purchasing agent of the Union Manufacturing Company.

Ques. 2. How long have you been connected with the company, and what branches or departments of said company have you been connected with?

Ans. I think this is the eighth year. I have occupied the position of traveling agent for six years, and for two years I have been purchasing agent, my present occupation.

Ques. 3. When did you commence the sale of double or cross crimped wash-boards as such traveling agent?

Ans. I think it was in August, 1872.

Ques. 4. At that time, what kinds of varieties of wash-boards did you find in the market?

Ans. There were several brands of common or single-crimped boards, but two other patent boards of any importance, that I know of—first, the "Union Groove," made by the Union Manufacturing Company. The patent improvement on that board was a grooved back; grooves which were intended to fit the corrugations and support them; it was a single-crimped
128 board. The "Eagle," which was a single-crimped board, the patent improvement consisting in the raised edges, to get the edges into a single saw kerf, and to turn the water back into the center of the board; another single-crimped improvement was made by cutting the edges of the zinc into the form of saw-teeth, for the purpose of pressing the zinc into the sides or legs of the wash-board, so as to do away with the necessity of cutting a place to receive the same. These were the only ones that had any prominence at that time.

Ques. 5. Please say whether or not you found any double or cross crimped boards of any kind in the market, and if you shall say that you did, please state what such boards were, by whom they were made, and under what patent, if you know.

Ans. The first cross-crimped board I ever recollect seeing was in Allegheny City, Pennsylvania, about the year 1871, in the summer or fall; it was made by Westly Todd, by himself, under his own patent. I was much impressed with the value of the board when I first saw it, and I took pains to find out all about it. I inquired where I could find Mr. Todd, went to see him, and tried to arrange to make the board on royalty, but found he had mortgaged it, and that no arrangement could be made that was satisfactory; this was the first and only cross-crimped board I found on the market.

Ques. 6. Did your company at any time attempt the manufacture of wash-boards under the Crihfield patent, Defendant's Exhibit 7; if so, what success did it have in the manufacture and in the sale of such boards?

Ans. We did in the year 1871, I think, commence to make wash-boards

under said patent, but found them a difficult board to make, and very unsatisfactory to handle in the market. The reason they were difficult to make was, the zinc in forming had to be pressed or stamped, which was a slow process, and spoiled a great many sheets of zinc by crushing or bursting the zinc in making the projections. It was not satisfactory to the trade because it did not give satisfaction to the consumers. I think the cases were
129 rare when we sold two lots to the same parties; there were plenty of cases where purchasers wanted to return what they had bought, and take single-crimped or common boards in exchange. We found it a complete failure.

Ques. 7. State, if you know, why your company commenced the manufacture of boards under that patent.

Ans. The reason was that we wanted to get hold of a new board that we could sell at a profit without so much competition as there was in the common boards; some of the firm thought we could run it successfully against the Todd patent.

Ques. 8. State, if you know, whether said company abandoned the making of boards under said patent; if so, why?

Ans. They did, because they found it was not a successful competitor with the Todd board, and not a satisfactory board to make and sell.

Ques. 9. How did it compare for service with the common single crimp board?

Ans. I think it was not as good as the common board.

Ques. 10. What efforts, if any, did you personally make in introducing the Todd board into the market; in your answer state fully all that you did in that direction?

Ans. I was well satisfied in my own mind before we got the Todd board to make that it was a superior board, and when I commenced the sale of them on the road I tried to induce every customer to take a few of them and give them a fair trial. They gave general satisfaction, and the trade in them increased rapidly. I visited most of the cities in Ohio, Michigan, Indiana, Illinois, Missouri, Maryland, District of Columbia, Pennsylvania, and Western New York, Kentucky, Iowa, Wisconsin, and Delaware.

(The foregoing testimony of Mr. Janney is objected to generally.)

ROBERT S. JANNEY.

130 The further taking of this deposition is this 2d day of May, A. D. 1877, continued and adjourned until to-morrow morning, May 3d, 1877, at 9 o'clock a. m.

ALURIAN HAIL,
Notary Public.

Thursday, May 3d, 1877, 9 a. m. Parties present as before.

ALURIAN HAIL,
Notary Public.

SAMUEL HERZIG, being produced, sworn, and examined, testified as follows:

Ques. 1. State your name, age, place of residence, and occupation.

Ans. My name is Samuel Herzig; am 32 years old; I reside in Toledo, Ohio; am a workman in the works of the Union Manufacturing Company, of Toledo, O.

Ques. 2. How long have you been in the employment of said company, and in what branch of their business have you been engaged?

Ans. Have been employed by said company about seven years. Have during that time been principally employed in making wash-boards, and in overseeing the company's wash-board department.

Ques. 3. During the time you was employed in making wash-boards for the company, what kind of boards did it make, and what parts of the boards did you make?

Ans. During the time the company manufactured the common board, a patented board called the "Union Grooved," a board made under the Crihfield patent, and the cross-crimped board. I have worked in every branch of the manufacture of the wash-boards named. This "Union Grooved" board was a board having straight single crimps, as in the old fashioned board, with the wood back so grooved as to fit the grooves or crimps of the metal surface.

Ques. 4. During any portion of the time you were engaged in making wash-boards did you work on any that were made after the plan
131 of the model now shown you, Defendant's Exhibit 8. If so, please state what difficulties, if any, were encountered in the process or processes used in manufacturing the metal portions of said board.

Ans. I was engaged in the manufacture of wash-boards made after the plan of the model now shown in Defendant's Exhibit 8. I can't now state how long I worked on that board, as it was some time ago. The difficulty mentioned was the breaking of the bulges in stamping the metal.

Ques. 5. What process of manufacture was used in making the Crihfield board, and what in making the Todd board?

Ans. The Crihfield board was made by a stamping-machine, and the other one was made by rollers, on a crimping-machine.

Ques. 6. Are the stamping and the crimping processes considered in the arts as the same, or as different processes?

Ans. Different processes.

Ques. 7. Please say whether or not the board in the Exhibit 8, can be made by the crimping process, and whether or not the Todd board can be made by the stamping process. In answering please give your reasons.

Ans. I don't think this board, Exhibit 8, can be made by the crimping process, for the reason that the bulges would break in the process. They must have tried the roller before they got the stamping-machine, because that is so much the easier, and would turn out a dozen where the stamping-machine would turn out one. I don't think it would be practicable to make the Todd board by stamping, because the process would not be rapid enough—couldn't turn them out in any quantity; besides I don't think it can be done.

Ques. 8. Please look at the Galusha and Safford model, Defendant's Exhibit 10, and say whether or not that board can be practically made; and if you say no, please state your reason.

Ans. No, it can't; because they don't provide for a back, and they can't get a crimper stiff enough to crimp that heavy metal. If they should crimp zinc it would break right through when in use. There is no way of holding the zinc in place.

132 Ques. 9. Please say whether, in your judgment, the Galusha and

Safford board can be practically made of sheet metal, for the market, by any process. Give your reasons for any answer you may make.

Ans. This model is made of sheet brass, and the projections appear to have been worked out by hand, one at a time. This process would not be practical. I don't know of any other process by which this board could be made.

Ques. 10. In manufacturing boards under the Todd patent state whether or not you have crossed the crimps at other than right angles; and, if so, state what the other angles were, when, and for what purpose you changed them.

Ans. I have made boards, under the Todd patent, with the crimps at other than right angles. I couldn't describe the angles. Mr. Warren told me to go to work and run some, and I made them at all sorts of angles. We did this to find out whether the cross crimps made that way would make a better washer than when the crimps crossed at right angles. I run these boards either in the spring of 1875 or the winter previous.

Ques. 10. In the variation of the angles made by you, how many boards did you vary, or about how many, and have you any of them left that you can identify? If so, produce them.

Ans. I don't know how many, but I think several dozens. Mr. Warren, then superintendent, took several to his house, and the others were packed and shipped with other Globe boards. I have a board which I now produce.

(Board here produced and offered in evidence, marked Exhibit F.—ALMON HALL, *Notary Public.*)

Ques. 11. When was the board, Exhibit F, made?

Ans. I think it was made in the spring of 1875 or the winter previous.

133 Ques. 12. Please look at complainan'ts Exhibit E, and say if you know when that board was made.

Ans. I did not see the board made, and never saw it until about a year ago.

Ques. 13. Please look at Complainants' Exhibit C, and say whether or not, in any of your variations of the angles you have made any that were like that exhibit. If you answer yes, state when the first one, to your knowledge, was made like that.

Ans. Yes; I think I made boards of that angle. I made boards of different angles, of all kinds, and must have hit that one. This was in the spring of 1875, or previously.

Ques. 14. Have you manufactured boards, similar to Plaintiffs' Exhibit C, for the market? If so, when did you make them?

Ans. No; because I went out of the shop about one year ago, and was absent about six months, and when I went back, went into another department. I only made the ones I have mentioned, similar to this Exhibit C, but didn't make them for market. They supposed the Globe was the best, and that's why they didn't keep on making them, as I suppose.

Ques. 15. Please look at the boards marked Complainants' Exhibit B and the boards Complainants' Exhibits F. M., 1 and 2, and say whether or not the three boards were manufactured by the same machinery and process.

Ans. These boards were all made by the same machinery and process, except those two (F. M. 1 and 2) were put into the crimper at a different angle. I made the Exhibit B myself, and the crimps are a little deeper than the usual crimping of our board.

Ques. 16. How do you vary the depth of crimping, in manufacturing crimped boards?

Ans. By set-screws adjusting the space between the rollers.

Ques. 17. In your judgment, are the boards Complainants' Exhibits C, and F. M. 1 and 2, the same or different boards from the board Complainants' Exhibit B?

Ans. I claim that they are all the same board, only in different forms.

134 Ques. 18. Please look at Lash's model board now shown you, Defendants' Exhibit 12, and say what, if anything, you find in said model that would suggest the Todd board, or instruct a workman how to make it.

Ans. I don't see anything in it that would give an idea to make a wash-board like Todd's, or any metal wash-board.

Ques. 18. What is the object or purpose of that hinged top piece on the Lash model?

Ans. It takes the place of the hands to hold the clothes. It has no other office. There is no improvement of the cloth under the rubber or holder.

Ques. 19. Please look at the board now shown you, and say what it is, or what it appears to be.

Ans. It appears from the mark on the back to be a Udell board.

(The board offered in evidence marked Complainants' Exhibit G.—ALMON HALL, *Notary Public.*)

Ques. 20. To what extent were the crimped boards manufactured by the Union Manufacturing Company similar or like the Udell board, Exhibit G?

Ans. The boards manufactured by our company were a cross between Exhibit 8 model, and Exhibit G. We made the points larger than in the model, but didn't connect them like they are in the Udell board.

Ques. 21. Is the board Exhibit G a stamped or crimped board?

Ans. It is a stamped board. That is the way we make ours; I think this is made the same way.

Ques. 22. Are either of the boards, Exhibit G, model 8, known or classed as double or cross crimped boards?

Ans. No, sir; not to my knowledge.

Ques. 23. If boards could be practically made like the model Exhibit 10, would you consider them to be cross-crimped boards?

Ans. No.

Cross-examined:

Cr.-ques. 1. In the Crihfield board made by your company
135 were the projections as large or larger than those shown you in the Crihfield model?

Ans. I don't think they were any larger. They were, I think, a little larger, but not any higher.

Cr.-ques. 2. Was not the main difficulty in making the Crihfield board occasioned by the size of the projections thereon?

Ans. I don't know whether it was that, or whether the metal wouldn't give as much as the projections took up.

Cr.-ques. 3. Have you any distinct recollections of a zinc or zincs which you crimped similar to that in Exhibit C?

Ans. Yes, I think I have some recollection of crimping such—something similar.

Cr.-ques. 4. These experiments in cross crimping, I understand you, were mere experiments, and not a regular manufacture for the market?

Ans. I made them according to Mr. Warren's orders. We didn't make any for the market that I know of.

Cr.-ques. 5. Have you since that time made any such for the market?

Ans. Yes, the company have made some.

Cr.-ques. 6. When?

Ans. I wouldn't be able to state when; it must have been in 1875.

Cr.-ques. 7. Were these latter made for, or put upon the market?

Ans. I think they were.

Cr.-ques. 8. And sold in the usual way?

Ans. I suppose they were.

Cr.-ques. 9. You have stated that you crimped Exhibit 1, B, deeper than the usual crimping of your board; state what was the purpose of crimping it deeper, and whether you did the same under orders, and, if so, from whom.

Ans. What the purpose was I don't know. They told me in the office to crimp one middling deep.

Cr.-ques. 10. When was this?

Ans. I don't remember; it was either 1875 or 1876; 1875, I think.

Cr.-ques. 11. You have stated that Exhibit B (complainants' boards) and Exhibit F. M. 1 and 2 were crimped on the same rollers. Are
136 not the rollers the same in form and operation as those used in crimping the ordinary board?

Ans. Yes.

Cr.-ques. 12. You have stated that you see nothing in the Lash patent that would suggest the making of the Todd board. Do you find any difference in shape between the individual projections on each of them?

Ans. The projection on the Todd patent is sharper, with a shorter shoulder, as I call it. The projections on the Todd board are more regular in length.

Cr.-ques. 13. Are they (the projections) not similar in shape?

Ans. They have some resemblance.

SAMUEL HERZIG.

CHARLES F. BISCHOFF, of lawful age, being produced, sworn, and examined, testified as follows:

Ques. 1. State your name, age, place of residence, and occupation.

Ans. Charles F. Bischoff; 28; Toledo, Ohio; I am foreman of the wash-board department of the Union Manufacturing Company.

Ques. 2. How long have you been with the company in the wash-board department?

Ans. Since May, 1869.

Ques. 3. What kinds or styles of boards have been manufactured by the company during that time?

Ans. The first was the Union Grooved board; this was a common board, the same as Exhibit 2 (defendant's). The back was grooved to fit the zinc. The next was the Crihfield; that was commenced some time in 1871; and the next was the Todd board—the Globe board, as we call it. That was in 1872.

Ques. 4. Please look at the board, Complainants' Exhibit G, and the model, Defendant's Exhibit 8, and say which, if either of these, the Crihfield board manufactured by the company resembled, and if it differed from them, state in what respects.

Ans. I should call this one (Exhibit 8) the nearest, because the points hardly touched each other, while in G they are run together. We did not make them like that at all.

137 Ques. 5. How, or by what process, did you form the knobs or diamonds in manufacturing the Crihfield board?

Ans. It was a press with hot dies, so as to make two rows at one time. I am not positive, but I know it did not press it all at once. At that time I was working on mouse-traps, and made only a few of those boards.

Ques. 6. Would there be any practical difficulty in stamping all the projections at once? If so, state what that difficulty is.

Ans. Could not do it; it would be too hard on the zinc; it would be too much strain on the zinc; it would burst out more by pressing it all at once than it would a few rows at a time.

Ques. 7. Please look at the model board, Defendant's Exhibit 10 (Galusha and Safford), and say whether or not zinc boards of that form could be practically made either by stamping or crimping.

Ans. No, sir; they could not.

Ques. 8. Please explain why.

Ans. Because the points pass each other, and it is more apt to wrinkle it up and break it out. I don't think a machine could be made to make a board like that.

Ques. 9. How do you judge this model board to have been made?

Ans. Well, sir, I judge that board was made by a punch, one at a time.

Ques. 10. By that you mean that each projection was separately made, do you?

Ans. Yes, sir.

Ques. 11. Would you consider that a practical method of manufacturing wash-boards for the market?

Ans. No, sir.

Ques. 12. Judging from appearance, how would you class that board in the art—single or double crimp; or what name would you give it?

Ans. I would not class it as a double crimp. I hardly know what name to give it.

Ques. 13. Please look at the boards, Exhibits F. M., 1 and 2, and state by whom they were made, and when.

Ans. I made them, day before yesterday. I think it was this week.

Ques. 14. Who was present when you made them?

138 Ans. Mr. Andrews, Mr. Perrin, Mr. Bond, Mr. Kitzmiller, Mr. Milward, and the boys who helped.

Ques. 15. Please state what difference in machinery or process, if any,

was used in the manufacture of these boards F. M., 1 and 2, and that of the common Todd or "Globe" board.

Ans. The same machinery was used, the angle being the only difference.

Ques. 16. In your judgment are the boards Exhibits F. M., 1 and 2, and C, the same as or different from the Todd board, or Complainants' Exhibit B? In answering please give your reasons.

Ans. I should say they are all one kind. The reason I give it is because they are all cross-crimped. The zinc is only turned at a different angle. The difference is all in appearance to the eye.

Ques. 17. Please look at the Lash model, Defendant's Exhibit 12, now shown you, and say what, if anything, you find in that model that would suggest the Todd board, or instruct a workman how to make the Todd boards.

(Latter part of question objected to by defendant's counsel.)

Ans. No, sir; I don't see any. I don't see where there could be any at all.

Ques. 18. For what purpose is the rubber attached to that model, and what would its use be in washing?

Ans. I don't see any use at all, only to protect the hands from rubbing out the face of the board.

Cross-examination waived, and defendant's counsel makes the following objection: He objects to all the foregoing testimony which relates to the process of manufacture of the different boards named, for the reason, first:

That the modes or processes of manufacture are not involved in this case; and second,

139 That such matter was entered upon by complainants in their prima facia case. Such objections having been taken in apt time.

CHARLES F. BISCHOFF.

GEO. A. HAULIN, being produced, sworn, and examined, testified as follows:

Ques. 1. What is your name, age, residence, and occupation?

Ans. My name is Geo. A. Haulin; 29; Toledo, Ohio; making washing-boards for Union Manufacturing Company.

Ques. 2. How long have you been engaged in such business, and what kind of wash-boards have you made?

Ans. At first we made the common or single crimped boards. Then we tried to make the stamped board under the Crihfield patent, and afterwards commenced the manufacture of the double-crimped boards under the Todd patent.

Ques. 3. Did you encounter any difficulty in the manufacture of Crihfield boards? If so, please state what that difficulty was fully?

Ans. The difficulty in making the Crihfield boards were, that the zinc had to be stamped instead of crimped, and the process was so severe on the metal that it broke it through both at the sides and at the points of the projections so made; and besides the operation was a very slow one.

Ques. 4. Please look at the Crihfield model now shown you, defendant's Exhibit 8, and say whether or not the boards made by the company were of that identical form, or somewhat modified; if you say that it was modified, please state in what respect.

Ans. The stamp was somewhat modified from this model; the points were prolonged and run together.

Ques. 5. Which would be the better form to manufacture, the way in which it was modified by you, or the form shown you in Exhibit 8?

Ans. It would be impracticable to make boards according to this model, even with a stamp, because the strain is too severe, and breaks it out; the modified form is, of course, the best of the two for manufacturing purposes.

140 Ques. 6. As modified by the company, what or about what proportion of loss would you have in making the zinc?

Ans. Well, the last ones I run, I run on an order of twelve dozens, and had to make sixteen dozen zincs to get twelve dozens of boards, because we lost four dozens by damage in stamping.

Ques. 7. What process did you use in manufacturing the Crihfield board, and what process in manufacturing the Todd board?

Ans. The Crihfield board was stamped, and the Todd board was crimped.

Ques. 8. Could these boards be made by reversing the processes, that is by crimping the Crihfield and stamping the Todd? If you shall say it cannot, please give the reason why.

Ans. The processes cannot be reversed. The reason why they could not be is, the Todd board could not be stamped, because it is a double process; if you undertook to stamp it, it would crush the crimp out, and be too severe on the zincs. To crimp the Crihfield board, I don't think a machine could be made, and if a machine could be make, it would cut all or nearly all of the zinc or metal, as the strain would be too severe.

Ques. 9. Could the Todd board be stamped by a single process?

Ans. It could not, because it would cut the zinc all to pieces; there is no doubt about it; my experience on the Crihfield board is conclusive evidence to me on that point.

Ques. 10. Please look at the model board now shown you of Galusha & Safford, defendant's Exhibit 10, and say whether or not full sized boards could be practically made, with metal portions, like the one there shown. In your answer, please give your reasons.

Ans. Well, I don't think it could be made practically for the market, because the board would have to be stamped, it could not be crimped, and the same reason would apply to it that I have named in the Crihfield, only I think this would be worse than the Crihfield on account of the points passing each other so closely.

Ques. 11. What effect does this passing of the points in that board, Exhibit 10, have in the process of stamping?

141 Ans. Well, the points being so close together, the strain of two of the projections would naturally break the metal.

Ques. 12. In manufacturing boards, under the Todd patent, have you at any time varied the angle at cross-crimping? If you have, please state what variations you have made, when they were made, and for what purpose.

Ans. I have varied them to almost every angle. The variations were made by running the zinc through the crimping rollers at different angles. These were made in the fall of 1872. They were made for sale on the market, and to try which was the best way of crimping the zinc.

Ques. 13. At what angle, or angles, have the boards been placed in reference to the frames?

Ans. The same variation, in reference to the frame, was at all sorts of angles.

Ques. 14. Have you present any old board which you can identify as one of the variations? If so, please produce the same.

Ans. I have, and now produce it.

(Board produced and offered in evidence, and marked Complainants' Exhibit E. Almon Hall, notary public.)

Ques. 15. When was the board, Exhibit E, made?

Ans. In the fall of 1872.

Ques. 16. When you varied the angles of crimping, did you understand that you were making the same or different boards, from the Todd board?

Ans. I understood it to be the same board, only in a different form.

Ques. 17. Please look at the board, complainants' Exhibit C, and say whether or not, in varying the angles, you made any like that; if you answer yes, state when the first one was made.

Ans. I think there is a little difference in the crimp, this being a little finer than ours. I think, no doubt, though, I made some at the same angle, that is in the fall of 1872.

142 Ques. 18. Have you any distinct or definite recollection of having made boards in which the crimped lines were at the same angle, or like the complainants' Exhibit C, with the exception of the fineness of the crimp?

Ans. I can't say that this is the exact angle, as I run by eye-sight, not having any gauge at the time.

Ques. 19. Judging by the eye, how much would it vary from the same angle?

Ans. I would say that I run some, I think, at this same angle.

Ques. 20. Please look at the model now shown you, defendant's Exhibit 12, and say what, if anything, you find in that model that would suggest the Todd board, Todd's rubbing surface, or instruct a workman how to make a Todd board.

Ans. I don't find anything here that would suggest the Todd board to me. I have had considerable experience in making wash-boards; I have been at the business nearly seven (7) years now. I have already said that I would not make the Todd board by looking at this model.

Ques. 21. Please look at the boards marked Exhibits F M, 1 and 2, and say whether or not you know how they are made.

Ans. Yes, I know how they are made.

Ques. 22. Please state whether any different machinery or process was used in the manufacture of those boards, that differed from the process or machinery used in the boards like complainants' Exhibit B?

Ans. The same machinery and process were used for both. The only variation was the angle of the crimp. All these boards were made in the same machinery.

Cross-examined:

Cr.-ques. 1. In your said manufacture of the Crihfield board, what size projections were made, as compared with those on the Crihfield model?

Ans. No, sir; they were larger, and the ends were slightly joined.

Whether they were any deeper than that, I could not say. I don't recollect.

Cr.-ques. 2. State approximately as to the comparative height of
143 the projections on the board you made, and on the Crihfield model.

Ans. Well, I think they were both about the same height.

Cr.-ques. 3. Was not one of the difficulties you met in the manufacture of the said Crihfield board occasioned by the heighth or depth of the projections thereon?

Ans. I think it was.

Cr.-ques. 4. In your experience in crimping, do you find zinc having different degrees of ductility and thickness—the latter in relation to the sheet?

Ans. Yes, sir; I find some that is more pliable than others, and there is a variation in the thickness of the sheets.

Cr.-ques. 5. Should the projections on the Crihfield board have been made no higher than on Exhibit B would you have met the same difficulty in forming projections on the former; that is, the Crihfield board?

Ans. Well, we probably would not have had as much difficulty, but some of the diamonds would break out.

Cr.-ques. 6. Were the angular boards referred to by you in answer 12 a success?

Ans. I did not hear of but one or two cases where they were considered a failure, compared with the Todd board.

Cr.-ques. 7. You say these were made in 1872. Has the company since then put any of such boards on the market?

Ans. They did; for the last two years, as near as I can recollect.

Cr.-ques. 8. Were these last referred to such as Exhibit C?

Ans. They were similar in appearance.

Cr.-ques. 9. Have you in your remembrance, or have you any distinct recollection of any particular board or boards crimped by you in 1872 in which the crimps intersected each other at the angles shown in Exhibit C?

Ans. As I said before, I could not tell the exact angle, as I run them by eye-sight, not having any gauge at the time; but I run some that had a similar appearance.

144 Cr.-ques. 10. Is it not true that your knowledge and recollection in the premises is vague and indefinite, and your present impression that you cross-crimped similar to that shown in Exhibit C, based upon the fact that you experimented at different angles, and now suppose that such experiments included the angle nearly like those in C, or have you a distinct recollection of certain zincs which were crimped in similarity to that in Exhibit C?

Ans. Well, I am satisfied that I crimped zincs in 1872 having the same appearance as that. I could not say that I remember any definite number, or any certain zincs.

Cr.-ques. 11. State what difference there is, if any, between the projections on the Lash model, in shape, and these on the complainants' board, shown in the drawing.

Ans. They don't look alike, at all, to my eye. There is a projection in the grooves in the Todd board, which is not in the Lash model. The grooves in the Lash model, of rubber board, run in contrary direction to those in the Todd board.

Cr.-ques. 12. The question is more particularly in reference to the shape of the individual projections in each.

Ans. Well, they are something similar to the Todd projections, being sharper on the apex.

Cr.-ques. 13. In crimping your board the second time on your machine could you make the depressions on the top of the ridges without making at the same time the projections in the bottoms of the valleys?

Ans. We could not.

Cr.-ques. 14. Are not the rollers used in crimping your board the same in general shape as those used to crimp Exhibit 13?

Ans. They are.

Cr.-ques. 15. Were those rollers used in making Exhibit F, M, 1 and 2?

Ans. They were.

Redirect-examination:

Ques. 1. What is the office or use of the rubber in the Lash board?

Ans. It is used instead of the hands.

145 Ques. 2. Of what use would the Crihfield board be if the knobs were made no higher than the projections in the Todd board?

Ans. It would be of no use whatever; it would not be saleable in the market; it was a failure with the knobs made as high as we made them, and it would be still worse if they were made smaller.

GEORGE H. HANLERS.

URANIA JANNEY, of lawful age, being produced, sworn, and examined, testified as follows:

Ques. 1. What is your name and residence?

Ans. Urania Janney; Toledo, Ohio.

Ques. 2. Are you the wife of Robert S. Janney?

Ans. Yes, sir.

Ques. 3. Have you tried wash-boards of various kinds for your husband? If you answer yes, please say what kinds you have tried, and which of the various boards you thought the best.

Ans. I have tried boards of various kinds for my husband. I have tried the "Union Grooved," "Diamond," and "Globe," and others. The Globe board I think decidedly the best.

Ques. 4. What board do you refer to as the Diamond board? Please look at the exhibits and point out any one you may see which resembles it.

Ans. This model (Defendant's Exhibit 8) is the nearest to it.

Ques. 5. Please say whether or not, in your opinion, the Globe board is any improvement over the common boards, like Exhibit 2.

Ans. I think it is a great improvement.

Ques. 6. In what respect do you think it to be an improvement?

Ans. It washes easier, I think much easier, and I think it does not wear the clothes out so much as the common boards; and it washes much quicker than any other.

Ques. 7. Do you think that the up and down grooves and ridges have any effect for improving the board for washing, and why?

Ans. I do; because it lets the clothes down into the suds better, and lets the water out from under the clothes, and cleans them quicker.

146 Ques. 8. How did the Diamond or Crihfield board compare with the Globe board in washing?

Ans. No comparison; the Globe board is decidedly the best.

Ques. 9. How did the Diamond or Crihfield board compare with the old common (Exhibit 2) board in washing?

Ans. I think I liked the common board (Exhibit 2) better than I did the Diamond. I did not like the Diamond at all.

Ques. 10. How do you think a board with rounded knobs, like the model, defendant's Exhibit 10, would act in washing in your opinion, as compared with the common board, Exhibit 2?

Ans. I think that (Defendant's Exhibit 10) would make a poor washer. I would like the common board the best.

Cross-examination:

Cr.-ques. 1. What has been the extent of your experiments with the Todd board?

Ans. I have used it for four years myself.

Redirect examination:

Ques. 1. How long have you had a "Globe" board?

Ans. I have had it six years. I think it is six.

Ques. 2. How constantly has it been in use, and, if you know, please say who made it?

Ans. It has been in use nearly every week since I got it. I think Mr. Todd made it.

Ques. 3. In what condition is it now?

Ans. It is as it ever was, as far as I can see.

URANIA JANNEY.

ELLEN MCDERMOTT, being produced, sworn, and examined, deposes and says as follows:

Ques. 1. What is your name and place of residence?

Ans. Ellen McDermott; Toledo, Ohio.

Ques. 2. Have you used any zinc wash-boards in washing; if so, what kinds have you used, and how long have you used them?

Ans. Oh, yes; I have used the plain crimped board. I have
147 also used this one for two or three years (Complainants' Exhibit B); the one I have is crimped deeper than any of these; coarser cross-crimp, I mean across the board.

Ques. 3. About how frequently have you had occasion to use wash-boards; that is, how many days in the week?

Ans. Between five and six.

Ques. 4. Please say which, in your opinion, is the best washing-board—the common board, Defendant's Exhibit 2, or the Globe board, Complainants' Exhibit B?

Ans. Oh, this is the one I have used (Complainants' Exhibit B).

Ques. 5. How much faster can you wash with the board Exhibit B, than you can with the old common board, Exhibit 2?

Ans. I can in a day's work be two hours quicker.

Ques. 6. With which board?

Ans. With this one (Complainants' Exhibit B).

Ques. 7. How long will a common wash-board, like Exhibit 2, last in use, and how long will a Globe board last, if both are used alike?

Ans. That's according to the treatment they get. If I put them away dry, and wash the soap out, they will last ever so many years longer.

Ques. 8. Which will last the longest?

Ans. Well, I never used up one of these yet (Complainants' Exhibit B). I suppose I have had one over three years.

Ques. 9. Where do the common boards wear or give out in use?

Ans. Just the very same as that (Complainants' E. A. K. 3). Some of them give out pretty soon.

Ques. 10. Did you ever wear out any of the common boards?

Ans. Oh, yes; I have worn out a good many.

Cross-examination waived by defendant's counsel.

her
ELLEN + McDERMOTT.
mark.

Mrs. ANNA NESSLER, being produced, sworn, and examined, testified as follows:

Ques. 1. State your name, age, and place of residence.

148 Ans. My name is Mrs. Anna Nessler; am 40 years of age; and I reside in the city of Toledo, O.

Ques. 2. Have you used any wash-boards that had a zinc washing surface in them; if so, when did you first use any zinc wash-board, and what kind have you used?

Ans. I have used wash-boards with zinc washing surface, and first used them over 20 years ago. First used the old-fashioned wash-board, then about five years ago began using the Globe wash-board, and have used that board ever since.

Ques. 3. About how frequently have you had occasion to use wash-boards—that is, how many days in a week?

Ans. Sometimes five days in each week for the last three years.

Ques. 4. Which do you think is the best wash-board, the Globe board or the old common wash-board, Exhibit 2?

Ans. I think the Globe is the best of all.

Ques. 5. About how much faster can you wash with the Globe board than you can with the common board?

Ans. I think I can wash two pieces on the Globe while I could wash one on the old board.

Ques. 6. Do you think the up-and-down lines on the Globe board help any, or do any good in washing?

Ans. Yes, I think so. I think that's what makes the difference.

Ques. 7. About how long will the common boards and the Globe boards last, if they are used about alike?

Ans. I think the Globe board will last a good deal the longest. I have had mine now five years, and it is just as good as new. The old-fashioned one would not have lasted more than 18 months.

Ques. 8. How do the old-fashioned ones give out or wear out?

Ans. As in these boards (referring to Exhibits E. A. K. 1, 2, and 3. Alman Hall, notary public).

Ques. 9. Have you ever worn out any of the common boards?

Ans. Yes.

Cross-examination waived.

ANNA NESSLER.

149 Mrs. ELLA M. HANLEN, of lawful age, being produced, sworn, and examined, testified as follows:

Ques. 1. What is your name and residence?

Ans. My name is Mrs. Ella M. Hanlen; I reside in the city of Toledo, Ohio.

Ques. 2. Have you used any wash-boards that had a zinc washing surface in them; if so, when did you first use any zinc wash-board, and what kinds have you used?

Ans. I have used the Globe wash-board, and the Diamond board, like Exhibit E, and the Exhibit 2 board, for about 6 years past; never used any other. Used the Globe board first. Have had it since I was married, about six years ago.

Ques. 3. About how frequently have you had occasion to use wash-boards—that is, how many times a week?

Ans. Once a week. I do my own washing.

Ques. 4. What kind of a board is the I X L board?

Ans. It is like Defendant's Exhibit 13, a straight crimped board.

Ques. 5. How will the Globe board compare with said Exhibit 13 for washing?

Ans. I would rather wash with the Globe board, because I think it washes better and faster.

Cross-examination waived.

ELLA M. HANLEN.

Mrs. ABBIE L. ANDREWS, of lawful age, being produced, sworn, and examined, testified as follows:

Ques. 1. State your name and place of residence.

Ans. My name is Abbie L. Andrews, and I live in Toledo, Ohio.

Ques. 2. What opportunities have you had for becoming familiar with or knowing the working qualities of metal-faced wash-boards?

Ans. I am the wife of A. Andrews, jr., president of the Union Manufacturing Company, and for that reason have taken a peculiar interest in washing devices, and have tested and had tested zinc wash-boards, and have become somewhat familiar with them.

150 Ques. 2*a*. Please state the different kinds you have tested, or had tested, and in your answer you can refer for identification to any of the boards or models before you.

Ans. I have tried boards like these three (referring to Complainants' Exhibits B, F. M. 3, and Defendant's Exhibit 2.)

Ques. 3. How did the work of the Globe board (Exhibit B) compare with that of the common board (Exhibit 2) in use?

Ans. I can say that the Globe board does the work very much easier and in less time than the old-fashioned board, and the clothes seem to have been very much better washed on the Globe board than on the other.

Ques. 4. Please look at the model board, Galusha & Safford, Defendant's Exhibit No. 10, and say whether, in your opinion, a full-sized board, with knobs made like those shown, would do good service in washing.

Ans. I should think it would be of very little use.

Ques. 5. Why do you think so?

Ans. Owing to the rounded form of the knobs. I don't think the

size of the knobs would make much difference. It seems like a smooth surface under the hand.

Cross-examination:

Cr.-ques. 1. In the common board referred to by you were the crimps finer or coarser than those shown in Defendant's Exhibit 2?

Ans. I should say that the common board referred to had crimps nearly like the crimps of Exhibit 2. They might have been a trifle coarser.

MRS. ABBIE L. ANDREWS.

(Defendant's counsel objects to all of the foregoing testimony, as to the use of the respective boards, and their durability, as irrelavent and not proper rebuttal.)

LA FAYETTE LYTTLE, being recalled, deposes and testifies as follows, in answer to interrogatories propounded by L. L. Bond, esq., of counsel for complainant:

Ques. 1. You have stated, in your previous deposition, that a
151 part of the time you had charge of the Union Manufacturing Company's books. Please state how the royalty accounts were made up by the company, and what styles of crimps were included in the reports for and payments of royalties to Messrs. P. Duff and Sons.

Ans. All of our sales, except a board occasionally to a workman, are entered upon a blotter, and from time to time, during each month, a copy of the sales of Globe wash-boards are entered in a book by itself, to the who bought them and the date at which they were shipped. At the end of each quarter the amounts footed (or number of dozens) upon which we make our returns of royalties. All styles of double or cross crimps were included in the royalty account, and paid for.

Ques. 2. Did the company manufacture any cross or double crimped boards that were cross-crimped at angles varying, in reference to their insertion to the frame, from the board Complainants' Exhibit B? If so, state what the variation or variations were when boards of varying angles were first made, and about how many have been made and were included in royalty reports, and what became of them.

Ans. They did manufacture boards at varying angles, some like Exhibit E, and others at a less angle. The most of the early ones were like E. They were not all at the same angle as Exhibit E; the angle was less. The boards of varying angles were first made in the summer of 1872. I should say there were from 30 to 50 dozens made—I could not say exactly—and they were mixed in with the bundles of the regular "Globe" boards, and sent out to customers on orders for Globe wash-boards.

Ques. 3. Has the company manufactured and sold boards having zinc rubbing surfaces, like Complainants' Exhibit F. M. 3? If so, when did they commence making boards like that, and whether or not boards of that crimp have been included in the royalty account.

Ans. Some of the original make of boards were similar to this (Com-
plainants' F. M. 3). The principal number we have made like
152 this (Complainants' Exhibit F. M. 3) were manufactured and sold in the years 1876 and 1877, and were all included in the royalty account.

Ques. 4. Did the company make or sell any boards like Complainants' Exhibit F. M. 3, with the frames added, during the years 1873, 4, and 5?

Ans. Some of these boards, similar to this (Complainants' Exhibit F. M. 3) were made each of those years. There might not have been any made in 1875, as I was out on the road, traveling, at that time, but in 1873 and 4 I am positive there were. In the fall of 1873 we talked of applying for a patent on the design similar to Complainants' Exhibit F. M. 3, but after consultation and consideration we were satisfied it was covered by the Todd patent, and did not do so.

Cross-examination:

Cr.-ques. 1. Were not substantially all of the boards you say were made at varying angles, in 1872, such as Exhibit E?

Ans. The greater portion of them were in that form, or similar.

Cr.-ques. 2. Have you or your company been able to find any made at that period having angles different from those of Exhibit E, so as to produce the same here?

Ans. I don't know that any effort has been made, particularly.

Cr.-ques. 3. Do you know the whereabouts of any such?

Ans. I do not, at present.

Cr.-ques. 4. Were those boards a success?

Ans. I don't think we made enough of them to know whether they were or not, from the fact that in our experiments we decided the crimp at right angles was the best form.

Cr.-ques. 5. You say that you made from 30 to 50 dozens; how many does it require to be put into operation in order to ascertain their quality—do you not think that 30 to 50 dozen' would be a fair experiment?

153 Ans. The quality of the board is a great deal easier to determine than its success. To know whether the board will be successful in the market requires a test of time.

Cr.-ques. 6. What number of boards such as Complainants' Exhibit F. M. 3, were made and sold by your company during 1873, '4, and '5?

Ans. I could not tell the number.

Cr.-ques. 7. Was there any considerable number made and sold in those years?

Ans. There were some of this kind included in the 30 to 50 dozens made in 1872, '3, and '4.

Cr.-ques. 8. Do you know where any of these boards like Exhibit F. M. 3, made between 1873 and 1872, now are?

Ans. That question has been answered once before; I do not.

Cr.-ques. 9. What proportion of the boards like Exhibit E were made in 1872 and '3?

Ans. I could not tell their proportion.

Cr.-ques. 10. Is it not true that your company virtually abandoned the manufacture of the board Exhibit E after its attempted introduction in 1872?

Ans. It is not true, for we never tried to introduce it.

Cr.-ques. 11. Is it not also true that your company did not commence the manufacture and sale of a double-crimped board, having its crimps intersecting each other at other than right angles, until after the coming into public notice of defendant's board?

Ans. We manufactured and sold boards crimped at angles crossing each other at other than right angles before that time mentioned.

Cr.-ques. 12. What are the angles of intersection of the crimps of Exhibit E?

Ans. The angles are nearly right angles, not quite.

Cr.-ques. 13. Then the substantial differences, if there be any, in the direction of the crimps, Exhibit E, and complainant's ordinary board consists in turning or placing the zinc partly around in the frame?

154, 155 Ans. The direction of the crimp in both boards would be about the same if the zincs were turned around, or placed in a similar position.

Redirect examination:

Ques. 1. To what end or for what purpose were your experiments in crimping at varying angles made?

Ans. For the purpose of determining the best form to be used.

Ques. 2. If you should make an effort to procure an old board made like the Exhibit F. M. 3, what would be its probable success?

Ans. I think I could find one.

LA FAYETTE LYTTLE.

156 United States circuit court, northern district of Illinois.

MRS. PETER DUFF ET ALS. *vs.* STERLING PUMP. COMPANY. } In equity.

DEFENDANT'S EVIDENCE.

DAVID J. POWERS, a witness produced on the part of the defendant, being first duly sworn, deposes and says in answer to interrogatories to him propounded by John G. Manahan, esq., as follows:

Int. 1. State your name, age, residence, and occupation.

Ans. David J. Powers; age, sixty-two years; residence, Chicago, Illinois; occupation, mechanical expert and manufacturer.

Int. 2. What opportunities have you had for becoming familiar with patents and patented inventions, and with mechanics, and the law and subject of patents?

Ans. I have been engaged in mechanical pursuits for more than half my life, and for the last twenty years have had considerable to do with patents and patented inventions, and as an expert in patent litigations before the United States courts.

Int. 3. State whether you recently critically examined the letters patent of the United States, Complainants' Exhibit A, in this case, and the board referred to therein, Complainants' Exhibit B.

Ans. Yes, I have done so.

Int. 4. Of what do you find such board to consist, substantially?

Ans. The board consists of an ordinary wash-board structure, upon which is secured a zinc plate, with a roughened surface produced by transverse and longitudinal corrugations or indentations.

157 Int. 5. Look upon the drawing shown in connection with such

patent, Exhibit A, and state whether you find any longitudinal grooves or depression therein shown?

Ans. I find on examining said drawing a series of *in*dentations upon the apex of the transverse ribs, which are placed upon the different ribs longitudinally in their directions to each other.

Int. 6. Look upon the board now shown you, marked Defendant's Exhibit 1, and state whether or not that more fully coincides with the board shown in the drawings of Exhibit A.

Ans. Yes; it corresponds more nearly; the *in*dentations in longitudinal lines not being quite as deep as in Exhibit B.

(Board shown witness offered in evidence by council for defendant, and the same is marked Defendant's Exhibit 1 O. W. B., *N. P.*)

Int. 7. State whether you find in Exhibit 1, any continuous longi*dit*unal grooves or depressions.

Ans. No, I do not; there is no continuous grooves longitudinally, nor are the depressions continuous; they only occur upon the apex of each transverse rib; there is a continuous line of those indentations longitudinally by following the transverse ribs; but, as before stated, the *in*dentations are not contin'ous.

Int. 8. Have you read the evidence of Mr. Kitzmiller herein?

Ans. Yes, I have.

Int. 9. When he refers to the board having longitudinal grooves or depressions, as being described in said patent Exhibit A, is he or is he not in error, in your judgement?

Ans. Construing the language literally, and considering it in a descriptive sense, he would be in error, for the reason stated in my last answer.

Int. 10. What do you find in the board last shown you, Defendant's Exhibit 1, which is erroneously stated in the patent Exhibit A, to be longitudinal grooves?

Ans. I find shallow *in*dentations upon the apex of the transverse ledges occurring one after the other upon each ledge, in a longitudinal direction.

158 Int. 11. State whether you find in the board last shown you, defendant's Exhibit 1, any longitudinal ribs or corrugations.

Ans. No, certainly not; to constitute ribs the grooves would need to be continuous, and the same would be the fact with corrugations, as they are both continuous raises or depressions.

Int. 12. Do you find any reference in the complainants' said letters patent, Exhibit A, to the existence of longitudinal ribs or corrugations in *in* their said board?

Ans. Yes; in their statement of the nature of their invention they state that their wash-board is constructed of a sheet-metal rubbing face, longitudinally and transversely corrugated or ribbed. They state that it is corrugated in their description; they also state that its rubbing surface is transversely ribbed or corrugated, in the summing up of the third claim.

Int. 13. Is the longitudinal ribbing mentioned in the third claim?

Ans. Certainly.

Int. 14. Is it one of the features claimed?

Ans. Certainly.

Int. 15. If you fail to find longitudinal ribs or corrugations in the

drawing, or in the board represented by the drawing of complainants' patent Exhibit A, Then, in your judgment as an expert, there is a claim in the letters patent for what is not exhibited in the model or drawing, is there not?

Ans. The description and the third claim both appear to refer to features not shown in the drawing, or the board, defendant's Exhibit 1.

Int. 16. What do you find in defendant's Exhibit 1, and in the drawing of Exhibit A, which is erroneously called by the complainants longitudinal ribbing or corrugations?

Ans. I find the indentations before mentioned upon the apexes of the transverse ribs.

Int. 17. The question is as to what is miscalled longitudinal ribbing.

Ans. I find the apexes between the said indentations, which I take it to be what is referred to as longitudinal ribs; but they are broken by each continuous transverse rib or groove—by the transverse grooves more properly; and hence appear to fail in any sense to form a longitudinal rib.

159 Int. 18. Then is it not true that this longitudinal ribbing referred to in the third claim is identical with the series of raised projections mentioned in the first claim of Exhibit A?

Ans. Yes; undoubtedly.

Int. 19. Wherein, as a matter of form or structure, does the raised projections referred to and shown in complainants' said patent Exhibit A differ from the longitudinal ribbing or corrugation?

Ans. They differ in the fact of not being continuous—only being apexes, rising at intervals. I understand a rib to be a continuous thing.

Int. 20. Look upon the first claim of complainants' said patent Exhibit A, and the drawing therewith, and state what the said first claim is really for.

(Objected to for the reason that it goes to the construction and scope of the claim, which belongs to the court.)

Ans. It is for a sheet-metal wash-board, having a series of raised projections, each bounded by longitudinal and transverse grooves or depressions.

Int. 21. From your knowledge of the art as it was preceding this alleged invention, in connection with the language there used, to what is that language mechanically limited?

Ans. It is limited to the peculiar arrangement and construction shown, to wit, a series of raised projections created by longitudinal and transverse depressions. That is the character of the invention described and shown, and also the substance of the claim.

Int. 22. Please look at the second claim in complainants' patent Exhibit A, and state what, in your judgment, is included therein.

Ans. The second claim embraces the elements of the first, in combination with ledges raised in the bottoms of the transverse projections, mark' C in the patent.

Int. 23. What are these projections C, and what their functions?

Ans. They are indentations upon the under side of the metal plates, corresponding to those upon the top side. They are placed longitudinally in line. Their function I fail to perceive. These indentations are formed by the under roller of the fluting machine while the impress is being

made upon the other side of the plate by the top roller, and would
160 necessarily be impressed there unless the machine is provided with a blank under roller when forming the indentations. I do not see as these raises in the bottom of the grooves can serve any purpose, either as a resisting rubbing surface, or a detent for the suds, or water, or discharge for it either. They serve no useful purpose, whatever, so far as I can see, but are there incidentally, as I have before stated.

Int. 24. What effect, if any, does it have in stiffening the board, as mentioned by Mr. Kitzmiller, or what necessity in fact is there for any stiffening of the zinc?

Ans. I do not think it could have any material effect in stiffening the plate, which is supported immediately upon its back, and also fitted in grooves at both sides. The plate would probably continue flat and firm upon the back as readily and as long without as with it.

Int. 25. State whether, in your judgment, the projections C are an operative element in the combination claimed in the second claim of Exhibit A.

Ans. I do not consider them an operative element, for the reasons already given, they serving no useful purpose whatever.

Int. 26. Can you, as an expert, see that the projections C have any action whatever in the process of washing clothes?

Ans. No; I should not suppose they would have the least bearing or effect upon the action or operation of washing.

Int. 27. Look upon defendant's board, heretofore given in evidence and marked Complainants' Exhibit C, and state whether you find any part or device therein corresponding to the projections C in the complainants' patent Exhibit A?

Ans. I do not find anything corresponding very nearly to the projections C of complainants' patent.

Int. 28. Then, if I understand you in relation to the longitudinal ribbing, you do not find either in the drawings of complainants' patent Exhibit A, or in their board, the longitudinal ribbing or corrugations referred to in the third claim of complainants' patent, Exhibit A?

Ans. No; I do not find anything either in the drawing or board amounting to a rib in a longitudinal direction.

Int. 29. Do you find any such ribbing in the defendant's board?

Ans. No; there is nothing of the sort in the defendant's board.

161 Int. 30. Then, in your judgement, the third claim is for a washboard involving a feature which is shown in neither the complainants' or defendants' board?

Ans. Such is my opinion and conclusion, that neither board shows a longitudinal rib, in a proper meaning of the term.

Int. 31. Looking at whatever projections there may be in the defendant's board, do you find any that are bounded by longitudinal and *and* transverse grooves?

Ans. No, I do not, as the grooves upon that board are all diagonal in their direction.

Int. 32. State whether, in your judgment as an expert, the board of the defendant is the same or substantially the same as that claimed in the complainants' patent Exhibit A?

Ans. I do not consider it the same in fact, or substantially the same,

and for the following reasons: In the state of the art in which roughened metallic wash-board surfaces are found, it will be seen that the invention in them depends upon the peculiar character of this roughened rubbing surface. Unlike a machine involving various parts and combinations, they necessarily are limited, or nearly so, to their precise device shown and *and* employed. We find boards with globular elevations, surrounded by depressions; we find them with straight lateral corrugations, which has been the board of the past generation, substantially; we find them with these lateral corrugations thereon, formed into zigzags in a certain way; we find the complainants' board shown, described, and claimed as having its ribbing surface produced by parallel transverse corrugations and longitudinal corrugations or indentations which, of course, puts the form of the individual elevations in a rectangular relatjon, and in view of the state of the art at the time of this invention, showing all of the different styles of rubbing surfaces that I have enumerated, and probably many more not referred to, we cannot suppose the complainant entitled to any special range of styles or modes of making his surface different from the one shown and described by him. He introduces no modifications or suggestions of modifications in his drawing or description, but confines himself literally and probably very properly to his construction just as it is. The same is true of the defendant in fabricating the rubbing surface of its board. It adopts a peculiar style of surface, which is diamond-wise in character, and produced by diagonal parallel lines, producing this diamond form of result. It produces, in fact, a very different rubbing surface
162 from that of the complainants. It certainly contains no transverse or longitudinal indentations or depressions or grooves. It shows no series of raised projections bounded by longitudinal or transverse grooves. It is true there is a series of raised projections, but they are bounded by diagonal grooves, instead of longitudinal and transverse, and raised projections in the state of the art were old at the time of this invention of complainants', as I am well aware. Thus, not considering an inventor in this line of invention entitled to any material breadth or range of styles or equivalents, I do not consider that the device of the defendant, in any respect or manner whatever, is the same in fact or substance as the device of the complainant. They are as unlike each other as the complainants' is from others that were paten'ed before, at least, if not more so.

Int. 33. Please look upon the board now shown you, marked Defendant's Exhibit 2, and state what that is.

Ans. Exhibit 2 shows the style of board with transverse grooves, that I referred to as the board of the past generation, which I have been accustomed to see for the last twenty-five or thirty years.

(Board shown witness offered in evidence by council for defendant, and the same is marked Defendant's Exhibit 2. O. W. B., *N. P.*)

Int. 34. In what does the face of the complainants' board differ from that of defendant's Exhibit 2?

Ans. Merely in the style of indentations and longitudinal lines across the exterior portion of the ribs of the plate upon both sides.

Int. 35. What, in your judgment, are the essentials of a good wash-board?

Ans. The essentials of a good wash-board are probably merely a good

metallic rubbing surface, presenting the requisite degree of abruptness to the line of motion and rubbing to produce continued and frequent action of the suds upon the material being acted upon in the process of washing.

Int. 36. State whether in your judgment the indentations in the complainants' board, in the apex of the transverse grooves, increases the rubbing surface of the board.

Ans. No, I should consider that it diminished it, as it removes so much of the angular resisting surface of the plate.

163 Int. 37. What do the projections C of the complainants' board have to do with the rubbing process?

Ans. Simply nothing.

Int. 38. State the difference, if any exists in your judgment, between the rubbing surfaces of the complainants' and defendant's boards.

Ans. The rubbing surface in the complainants' board is interrupted at frequent intervals by longitudinal indentations—that is to say, its depressions are removed slightly out of the way of the line of resistance; whereas in the defendant's board the diamond-shaped prominences stand in such position, the diamond being transverse in its greatest length upon the face of the board, as to produce or rather to retain the entire lateral line of resistance or rubbing surface; and probably it also improves it from the fact that the direction of the resistance is continuously changing the rubbing action upon the goods. The action would be more active and continuous than upon the continuous lateral lines of the old-fashioned board, like defendant's Exhibit 2, or the board of complainants, which, as before stated, depresses at frequent intervals, in such manner as to present less resistance than would a continuous lateral line.

Int. 39. In the operator passing the clothes down the complainants' board how many sides of the projections would the clothes meet?

Ans. One side of the projection of the complainants' board.

Int. 40. Under like circumstances, how many sides of the projections of the defendant's board?

Ans. Two sides.

Int. 41. State whether, in your judgment as an expert, the board of the complainants' is of any practical advantage over the old board, defendant's Exhibit 2.

Ans. I should consider not, in the fact of real utility; it may have the advantage of being a novelty in appearance, which might aid its selling; but I do not believe it will wash a particle more, with a good amount of muscular effort, if as much, as the old-fashioned board.

(Council for defendants offers in evidence from the records of the United States Patent , certified copy of letters patent of the United States granted to George Witsil et al., dated August 16th, 1864, No. 43887, and the same is marked Defendant's Exhibit 3. O. W. B., *N. P.*)

164 Int. 42. Please look upon Defendant's Exhibit 3, and state what that consists in.

Ans. This Exhibit 3 shows a board with circular depressions, and raises called annular. These are arranged in regular order upon the face of the board; and their object is to produce the irregularities desired to cause the proper action upon the article being washed. This exhibit shows a series of raised projections as stated in the first claim of complainant's patent, Exhibit A, but they are not bounded by longitudinal and trans-

verse grooves or depressions, but by circular grooves or depressions corresponding to their form, which goes to show that complainants would not be entitled to adopt a circular form of depressions, or a diamond form, but in the language of their patent would be confined to a rectangular form, and not only a rectangular form, but one produced by transverse and longitudinal lines.

(Council for defendant offers in evidence from the records of the United States Patent Office printed copy of the specification and drawings of the United States patent granted to Jacob H. Beidler, dated March 3rd, 1868, No. 75114, and the same is marked Defendant's Exhibit 4. O. W. B., *N. P.*

The introduction of Defendant's Exhibit 3 and 4 in evidence, and all testimony relating thereto, objected to by counsel for complainants, for the reason that they are not named in the answer.

Counsel for defendant offers in evidence certified copy from the records of the United States Patent Office, of the United States letters patent granted to Joseph Keech, dated April 10th, 1860, No. 27811, and the same is marked Defendant's Exhibit 5. O. W. B., *N. P.*)

Int. 43. State whether you have examined this patent, Defendant's Exhibit 5; and, if so, state what it is, substantially.

Ans. I have examined the said patent, and find that it shows a washboard with a rubbing surface, grooved or ribbed cross-wise, not in straight lines, but by shurred or slightly zigzag lines. It has no other peculiarity that I notice.

Int. 44. It is a zinc board, is it?

Ans. It is a metallic board.

165 (Counsel for defendant offers in evidence, from the records of the United States Patent Office, printed copy of the specification and drawing (uncertified) of the patent granted to Bellus and Bowers, dated September 7th, 1869, No. 94551, and the same is marked Defendant's Exhibit 6. O. W. B., *N. P.*)

Int. 45. Please look upon Defendant's Exhibit 6, and state what that is?

Ans. Exhibit 6 shows a wash-board with a rubbing surface made by the use of a metallic flat plate, into which, at proper intervals, are inserted round-headed nails, or button heads, of a proper size to constitute the wished for inequalities of a rubbing surface. They do not seem to be arranged in any particular order, either transverse or longitudinal or otherwise.

Int. 46. State whether you find in said patent a sheet-metal washboard, having a series of raised projections.

Ans. Yes, sir; it has a series of raised projections, and is a sheet-metal wash-board, so far as the metallic plate is concerned.

Int. 47. And whether such projections are rounded off, so as not to produce sharp or angular points?

Ans. Yes, such is the fact to the fullest extent, of course.

(Counsel for defendant offers in evidence, from the records of the United States Patent Office, printed copy of the specification and drawing (uncertified) of the patent granted to A. R. Crihfield, dated October 18th, 1870, No. 108,456, and the same is marked Defendant's Exhibit 7. O. W. B., *N. P.*

Also certified duplicate of the model filed with the application of said

Crihfield, in the United States Patent Office, and the same is marked Defendant's Exhibit 8. O. W. B., *N. P.*)

Int. 48. Look upon Defendant's Exhibits 7 and 8, and state what you find them to be.

Ans. I find in said exhibits a wash-board with a rubbing surface, which consists of a series of raised projections upon a metallic plate, said projections being of a flat form, rounded off in such manner as to present a proper resistance to the goods being rubbed upon them.

Int. 49. State whether the projections in the defendant's exhibits last referred to fall within the general description given in the complainants' patent, Exhibit A.

166 Ans. It has a series of raised projections bounded by indentations in the lower surface of the metal sheet. The indentations are not longitudinal nor transverse, as is referred to in the first claim of the complainant's patent.

Int. 50. What is the character of the sides of the projections in the patent last referred, Defendant's Exhibit 7?

Ans. They are rounded off upon their resisting sides, so as to present the proper amount of resistance.

(Counsel for defendant offers in evidence certified copy from the records of the United States Patent Office, of the patent granted to Wm. M. Galusha and Benjamin Safford, dated December 29th, 1857, No. 18965, and the same is marked Defendant's Exhibit 9. O. W. B., *N. P.*

Also certified duplicate of the model filed with the application of said Galusha and Safford in the United States Patent Office, and the same is marked Defendant's Exhibit 10. O. W. B., *N. P.*)

Int. 51. Look upon Defendant's Exhibits 9 and 10, and state of what the invention therein shown and described consists.

Ans. Exhibits 9 and 10 show another style of wash-board, having a metallic plate stamped into regular form of rubbing surface, by raising the oval portions of the same at intervals in irregular order—the longest way of the oval being transverse on the board. These raised surfaces, with the depressions between and around them, constitute a rubbing surface consisting of a series of raised projections surrounded by depressions. Broadly considered, they embody the essence of the first claim of the complainant's patent, Exhibit A, but they lack the longitudinal and transverse lines of depressions recited in said patent. These elevations also contain the same easy rounded form and surface of elevations in said patents.

Int. 52. State whether each projection taken as an individual is bounded longitudinally and transversely by a depression?

Ans. Each projection, individually considered, is bounded by longitudinal depressions, in part, and also by transverse depressions of the same kind, although they are not strictly of that character.

(Counsel for defendant offers in evidence certified copy from the
167 records of the United States Patent Office, of the letters patent granted to John S. Lash, dated August 29th, 1865, No. 49635, and the same is marked Defendant's Exhibit 11. O. W. B., *N. P.*

Also certified duplicate of the model filed with the application of said Lash in the United States Patent Office, and the same is marked Defendant's Exhhibit 12. O. W. B., *N. P.*)

Int. 53. Look upon Defendant's Exhibits 11 and 12, and give the nature of the construction of the board therein described and shown.

Ans. This board in its general arrangement is somewhat unlike those we have been examining, and is composed of a series of rollers adapted to an ordinary wash-board frame, said rollers being turned with grooves and prominences between them so as to present surfaces of different diameters, and placed in a series as nearly together as practicable with freedom of action. Accompanying this roller arrangement is what they term a rubbing board, which consists of a flat piece of wood with channels cut across its face, and channels less deep cut transverse across the other way, making the surface in appearance identical with that of the rubbing board of complainants in this case, excepting the absence of the raised portions in the bottoms of the grooves, termed projections C in the patent. As before stated, the resemblance between this rubbing surface and the one shown in the complainants' board is identical, saving the difference before stated, and it would almost seem to be as though the model was under the eye of the inventor when that invention was made. In operation the clothes or articles to be washed are placed upon the rollers, and the rubbing board is applied to the other side of them, and vibrated up and down upon the top surface of the clothes, while the rollers underneath them are caused to revolve, and having different diameters, portions of said rollers necessarily traverse upon the clothes during such rubbing operation. Between the two surfaces thus in action the clothes are washed. This rubbing board, as before stated, shows a series of raised projections each bounded by transverse and longitudinal grooves or depressions, coming precisely within the language of the first claim of the complainants' patent, Exhibit A, except so far as the device is constructed of wood whilst the complainants' is made of metal. It also comes as fully within the language of the third claim of the complainants' patent, Exhibit A, except that it might not be held to be the wash-board proper, and is also of wood instead of metal, as in the former case.

168 By consent of counsel a recess was had till two o'clock p. m.

Two o'clock p. m., present as before.

Int. 54. Have you examined the specification of the Lash patent?

Ans. I have.

Int. 55. Do you find anything therein in reference to the material of which the rubbing board is made?

Ans. I do not. I was aware when I referred to that matter that it made no difference in a patentable point of view.

Int. 56. At the time you say you were familiar with boards of the character of Exhibit 2, having a zinc washing surface, state whether or not there were boards having wooden washing surfaces substantially the same?

Ans. Yes, there were also wooden boards having surfaces of a similar character. There were wooden wash-boards used of a similar form to the corrugated metal, more like that than the metal concave board.

Int. 57. State whether, and if so, for how long, zinc and wood have been well-known equivalents for rubbing surfaces in wash-boards?

Ans. From twenty-five to thirty years, for certain; and I think some longer.

Cross-examination of said witness by L. L. BOND, Esq.:

Cr.-int. 58. Do you understand how these zinc wash-boards are crimped?

Ans. Yes; I have had it explained to me how; and know mechanically how it would have to be done to be done successfully. I crimp a wire in a similar manner in my own manufacture of mattresses.

Cr.-int. 59. Does not the depth or extent of the crimp, either transverse or longitudinal, depend entirely upon the distance or space between the crimping-rollers?

Ans. Yes; the space between the rollers governs the depth of the crimps. To make them less or more they put the rollers farther apart or nearer together.

Cr.-int. 60. Do you understand that the complainants are by the terms of their patent limited as to the depth or extent of either the transverse or longitudinal crimps?

169 Ans. No; probably not precisely. They would simply have to be of a proper *in* depth proportion to the lateral width of space, &c.

Cr.-int. 61. How long a portion of raised metal is necessary to entitle it to the name of a rib?

Ans. No precise length would be necessary to determine it. It would have to be however considerably longer than it was wide to come within the scope of that term. The term used mechanically always indicates a thing several times the length of its width, so far as I think of any application of it; for instance, the ribs of the human frame, the ribs in a boat, are usually considerably longer than they are wide, else they would be more elevations of material, prominences instead of ribs.

Cr.-int. 62. Considering the carelessness or differences of the public in using mechanical terms, do you think it a very bad use of language to call the projections marked C in the complainants' patent, Exhibit A, ribs?

Ans. I think they might be called ribs without any very wide departure from the meaning, especially when they are placed where they are, at the bottom of the transverse channels.

Cr.-int. 63. In what direction is the power applied when actually washing on one of these boards?

Ans. Mainly lengthwise, probably.

Cr.-int. 64. When the power is applied in that direction, and the rubbing surface is made of light zinc, do you not think the projections marked C in the patent Exhibit A would have a considerable tendency to stiffen the crimped plate?

Ans. They would have that tendency to the extent that they might be raised, undoubtedly, but at the extent to which they are raised, or shown to be raised in the drawing or in the model, Defendant's Exhibit 1, corresponding to the patent, it would strike me as being almost too slight to contribute any appreciable support. If zinc was used of a suitable thickness for such purposes I should hardly think they would be needed; it may be if it was very thin they might remedy the defect somewhat.

Cr.-int. 65. So far as *as* the upper indentations are concerned, which are called corrugations in the patent Exhibit A, would they not have the same effect in stiffening the zinc at the upper angle that the projections or ribs C have in stiffening the lower angle?

Int. 53. Look upon Defendant's Exhibits 11 and 12, and give the nature of the construction of the board therein described and shown.

Ans. This board in its general arrangement is somewhat unlike those we have been examining, and is composed of a series of rollers adapted to an ordinary wash-board frame, said rollers being turned with grooves and prominences between them so as to present surfaces of different diameters, and placed in a series as nearly together as practicable with freedom of action. Accompanying this roller arrangement is what they term a rubbing board, which consists of a flat piece of wood with channels cut across its face, and channels less deep cut transverse across the other way, making the surface in appearance identical with that of the rubbing board of complainants in this case, excepting the absence of the raised portions in the bottoms of the grooves, termed projections C in the patent. As before stated, the resemblance between this rubbing surface and the one shown in the complainants' board is identical, saving the difference before stated, and it would almost seem to be as though the model was under the eye of the inventor when that invention was made. In operation the clothes or articles to be washed are placed upon the rollers, and the rubbing board is applied to the other side of them, and vibrated up and down upon the top surface of the clothes, while the rollers underneath them are caused to revolve, and having different diameters, portions of said rollers necessarily traverse upon the clothes during such rubbing operation. Between the two surfaces thus in action the clothes are washed. This rubbing board, as before stated, shows a series of raised projections each bounded by transverse and longitudinal grooves or depressions, coming precisely within the language of the first claim of the complainants' patent, Exhibit A, except so far as the device is constructed of wood whilst the complainants' is made of metal. It also comes as fully within the language of the third claim of the complainants' patent, Exhibit A, except that it might not be held to be the wash-board proper, and is also of wood instead of metal, as in the former case.

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Ans. I have.

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Int. 56. At the time you say you were familiar with boards of the character of Exhibit 2, having a zinc washing surface, state whether or not there were boards having wooden washing surfaces substantially the same?

Ans. Yes, there were also wooden boards having surfaces of a similar character. There were wooden wash-boards used of a similar form to the corrugated metal, more like that than the metal concave board.

Int. 57. State whether, and if so, for how long, zinc and wood have been well-known equivalents for rubbing surfaces in wash-boards?

Ans. From twenty-five to thirty years, for certain; and I think some longer.

Cross-examination of said witness by L. L. BOND, Esq.:

Cr.-int. 58. Do you understand how these zinc wash-boards are crimped?

Ans. Yes; I have had it explained to me how; and know mechanically how it would have to be done to be done successfully. I crimp a wire in a similar manner in my own manufacture of mattresses.

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Ans. Yes; the space between the rollers governs the depth of the crimps. To make them less or more they put the rollers farther apart or nearer together.

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Cr.-int. 62. Considering the carelessness or differences of the public in using mechanical terms, do you think it a very bad use of language to call the projections marked C in the complainants' patent, Exhibit A, ribs?

Ans. I think they might be called ribs without any very wide departure from the meaning, especially when they are placed where they are, at the bottom of the transverse channels.

Cr.-int. 63. In what direction is the power applied when actually washing on one of these boards?

Ans. Mainly lengthwise, probably.

Cr.-int. 64. When the power is applied in that direction, and the rubbing surface is made of light zinc, do you not think the projections marked C in the patent Exhibit A would have a considerable tendency to stiffen the crimped plate?

Ans. They would have that tendency to the extent that they might be raised, undoubtedly, but at the extent to which they are raised, or shown to be raised in the drawing or in the model, Defendant's Exhibit 1, corresponding to the patent, it would strike me as being almost too slight to contribute any appreciable support. If zinc was used of a suitable thickness for such purposes I should hardly think they would be needed; it may be if it was very thin they might remedy the defect somewhat.

Cr.-int. 65. So far as *as* the upper indentations are concerned, which are called corrugations in the patent Exhibit A, would they not have the same effect in stiffening the zinc at the upper angle that the projections or ribs C have in stiffening the lower angle?

Ans. Yes; probably much the same.

170 Cr.-int. 66. What do you understand to be the reason or cause operating to cleanse the cloth when a board of this kind is used? Or, in other words, what is your theory of washing on one of this class of boards?

Ans. I consider the mechanical action that takes place to be a soakage of the fabric with water, or suds, or chemicals, and the expulsion of this suds by coming in contact with the corrugations, under pressure, the suds carrying the dirt along with it. This process is repeated between each corrugation, probably. When the pressure ceases upon the fabric it immediately absorbs water; when the fabric comes in contact with the corrugations again the water is immediately expelled, carrying the dirt with it; so that the operation has a succession of taking in water and expelling it from the fabric. Any machinery or device that will do that efficiently and handily will cleanse clothing or anything to be cleansed or washed in that manner. Mere friction alone would not remove foreign substances from the interior texture of the cloth or garment. The water, under this theory, becomes the carrier merely of the foreign matter from the interior of the cloth to the exterior and away from it entirely.

Cr.-int. 67. So that in rubbing the cloth, in a board like Defendant's Exhibit 2, which has twenty ridges, there would be, in its length, twenty successive operations, would there?

Ans. There might be to a certain extent, depending upon the rapidity of the washing. The succeeding corrugations also act upon each other to fully expel the water. Did you traverse from one end of the rubbing-board to the other, where the motion was rapid on the board, the water would not be able to enter the texture of the fabric again to any great extent, perhaps. Whoever has observed the process of washing will remember that it is customary to souse the garment down into the suds to resupply the moisture, and then to rub it measurably dry again over the surface of the board.

Cr.-int. 68. Can a wash-board having its face made of rollers that revolve freely, operate upon this principle?

Ans. Yes; I should consider that it might. The impinging portion of the roller brings the greater pressure between the rollers.

Cr.-int. 69. Would not a roller board lose the benefit of the friction, whatever that may be, in washing?

Ans. Yes; there would be no friction in straight rollers. Un-

171 equal-sized rollers, like Exhibit 12, would give an unequal pressure; but the friction would be less upon any roller than upon stationary ledges.

Cr.-int. 70. In Defendant's Exhibit 12, to which you have just referred, does the rubber-block perform any other or different office than that performed by the hand, in wash-boards like complainants' and defendant's?

Ans. No; there is no substantial difference; it takes the place of the hand or hands. It may, however, be more serviceable in producing the result from its rigid and corrugated character; probably would be.

Cr.-int. 71. Where do you find in Defendant's Exhibit 7 and 8, Crihfield's patent and model, any indentations, unless you turn the metal sheet over?

Ans. There are no indentations properly between the prominences;

still the body of the metal, being lower down, stands in the same relation to the prominences that the indentations do in complainants' patent, Exhibit A; still they are not strictly, in language, indentations.

Cr.-int. 72. Which one of the several patents and models exhibited by the defendant in reference to the state of the art do you think comes the nearest to anticipating the complainants' patent, Exhibit A?

Ans. As a wash-board complete, the Galusha and Safford, Defendant's Exhibit 10, comes the nearest to showing a series of elevations and depressions as stated in complainants' patent. It is made differently, yet its elevations are transverse and longitudinal substantially. The rubbing board, or wash-board—it is called by both names—in Defendant's Exhibit 12, shows the style of corrugations or indentations in complainants' patent Exhibit A more fully than anything else in the state of the art here shown, so that I would consider that Exhibits 10 and 12 have more in them to suggest the idea of complainants' invention than any other of the exhibits in the case.

Cr.-int. 73. Have you had any practical experience in the manufacture or use of wash-boards?

Ans. No; I never have had.

Redirect examination:

R. D. 74. You have been asked in relation to the mechanical effect of washing clothes. I will ask you whether it is not advantageous in that process to have the flutes or valleys of sufficient depth to retain a sufficient amount of water?

172 Ans. I understand that it is so considered by those familiar with wash-boards.

R. D. 75. You have stated that in Defendant's Exhibit 12 the rubbing board performs the office, substantially, of the hands on an ordinary wash-board. Do you understand that in that board, Exhibit 12, the rubbing board passes over the clothes?

Ans. I do understand that it would, more or less. It is stated in the patent that the channels act both upon the clothes to hold them—make them traverse with it—as well as to act upon the material to express the water.

DAVID J. POWERS.

AARON J. HULL:

Int. 1. State your name, age, residence, and occupation.

Ans. Aaron J. Hull; age, 43 years; residence, Sterling, Illinois; have resided there for nineteen years; occupation, manufacturer of pumps, wash-boards, and various other articles.

Int. 2. Are you familiar with the method of crimping zinc for wash-boards?

Ans. Yes, sir.

Int. 3. How is it crimped?

Ans. The method of crimping is by two fluted rollers, one above the other, the zinc passing between them.

Int. 4. Look upon Defendant's Exhibit 2, and state how long you have known a board with a washing surface of that character to be consecutively in public use.

Ans. I have seen them since I can remember. They have been in use, so far as I know, as far back as I can remember. I cannot remember when they did not have them. The board was, perhaps, made differently, but the zinc part was the same.

Int. 5. When, if ever, did you know of a wood washing surface corrugated like or nearly like this Exhibit 2?

Ans. I have seen wood corrugated on the same plan like that (Exhibit 2) some time ago—since I was about eight to ten years of age. I have seen them since within the last two or three years.

173 Int. 6. When did you first see zinc crimped for wash-boards, such as Exhibit 2?

Ans. About eighteen years ago; I think it was eighteen years ago.

Int. 7. How was it done on that occasion?

Ans. It was done with two rollers on a fluting machine, the same as now in use.

Int. 8. Were or were they not the same kind as used by you in your manufacture?

Ans. The same kind of rollers; the crimp, however, is a little finer, but the same kind of crimping machine.

Int. 9. What causes the different widths in corrugations of different boards, when there is such?

Ans. The different sized flutes in the rolls that make the corrugations in the zinc.

Int. 10. Do you employ one or more different widths?

Ans. We employ three different widths of machines for crimping.

Int. 11. Look upon Defendant's Exhibit 13, and state what that is.

Ans. That is a wash-board that is made by us at our factory on our machine, by crimps, the same as all or nearly all of our wash-boards are made.

(Council for defendants offers in evidence the wash-board shown witness, and the same is marked Defendant's Exhibit 13, O. W. B., N. P.)

Int. 12. Is the machine which crimped, Defendant's Exhibit 13, the same or not as the machine which crimps your patent boards?

Ans. The same machine.

Int. 13. State what difference, if any, there is between the machine which you use for crimping, and the machine which you say you saw eighteen (18) years ago.

Ans. No difference, except in the width of the flutes on the rolls, which make the corrugations.

Int. 14. State, if you know, whether such machine is the kind in general use for making the boards such as Defendant's Exhibit 2.

Ans. The same machine, except in width of the crimps.

174 Int 15. What practical advantage is there in complainants' board over Defendant's Exhibit 2?

Ans. I do not see any.

Cross-examination of said witness by L. L. Bond, Esq.:

Cr.-int. 16. If there are no practical advantages in double-corrugated boards, over single corrugated boards, like Defendant's Exhibit 2 and 13, why do you not manufacture your boards like said exhibit?

(Objected to as misleading.)

Ans. Where the board is a double-crimped board, crimping it diag-

onally makes the crimp double; crimping it lengthwise, longitudinally and transversely, there is but one set of corrugations that the clothes strike; but crimping like these boards are crimped, diagonally, the clothes strike two sets of corrugations, and makes a double washing surface. We have sold a great many of those plain crimped boards, Defendant's Exhibit 2 and 13, in the past few months. We make both of them.

Cr.-int. 17. Is not the *board*, Complainant's Exhibits B, a double-crimped board?

Ans. Well, as this board is crimped it looks that way; but as they sell their boards on the market they would not be taken to be a double-crimped board; perhaps this being a good deal deeper than they sell to the trade, is the reason.

Cr.-int. 18. Does not the depth of the crimp depend entirely upon the distance at which the crimping rollers are set apart?

Ans. The depth depends on that.

Cr.-int. Does not the line of the crimping depend entirely upon the angle at which the zinc sheets are run through the machine?

Ans. Certainly.

Cr.-int. 20. At what place did you first see a crimping roller in operation?

Ans. In Moline, Illinois.

Cr.-int. 21. Do you consider that the variations in the angle at which the zinc is run through the machine amounts to the invention of a new wash-board?

175 Ans. If the variation makes a new device I consider it a patentable article.

Cr.-int. 22. At what angle, in relation to top and bottom of your board, are the crimps made?

Ans. Twenty-two and a half degrees ($22\frac{1}{2}°$).

Cr.-int. 23. Would a board crimped at forty-five degrees (45°) be the same as your board, or a different board?

Ans. It would be a different board.

Cr.-int. 24. Would one at thirty degrees (30°)?

Ans. Well, the variation from twenty-two and a half degrees ($22\frac{1}{2}$) to thirty degrees, (30°) would be slight. The combination would be the same.

Redirect examination.

R. D. 25. Do you know whether a board double crimped at an angle of forty-five degrees (45°) and set in the frame diagonally of the crimp, would be a success or not?

Ans. It would be a failure.

R. D. 26. Do you speak from actual knowledge, in such cases?

Ans. We have tried them, and they are not a success.

R. D. 27. For what reason?

Ans. To' near a rubbing surface. To' much sameness.

R. D. 28. To' near longitudinal?

Ans. Yes, sir.

Recross-examination:

R. C. 29. Then, is it not true that the nearer square, or at right angles they are, the better they are?

Ans. I think not; I think a diamond projection has more washing surface, being two-sided, or rather, pointed, gives a better washing surface than a square, abrupt surface.

R. C. 30. Then there is not an advantage in a double over a single crimped board, so far as washing is concerned?

Ans. As our board is crimped, marked Exhibit C, I think it is.

(Council for defendant offers in evidence printed copy of specifi-
176 cation and drawing of letters patent of the United States granted to Aaron J. Hull, dated December 29th, 1875, No. 175568, and the same is marked Defendant's Exhibit, 14, O. W. B., *N. P.*

R. C. 31. Please say whether the Sterling Pump Company, the defendant, is manufacturing under this patent, Defendant's Exhibit 14, under agreement with you?

Ans. Yes, sir.

AARON J. HULL.

It is stipulated and agreed by and between the counsel for the respective parties hereto, that no objection shall be had or taken to the printed copies of patents offered in evidence by the defendant, and that the same may be used with the same force and effect as though they were properly certified by the Patent Office, so far as the same are properly in evidence.

O. W. BOND,
Notary Public.

AMOS FASSETT; age, 58; occupation, practical mechanic; resides at Sterling.

Int. 3. State what means you have had, if any, of becoming acquainted with mechanics and subject-matter of patented improvements therein.

Ans. Well, I have worked at mechanical work, more or less, for 30 years. While working I endeavored to see the reason or propriety of the construction, as well as the form of the work being done. I have spent considerable time upon different pieces of mechanical work, endeavoring to improve known ways of accomplishing mechanical results. Have succeeded in obtaining three patents in my own name as full inventor; and entire inventor of one other patent issued jointly with another.

Int. 4. State whether you observed improvements in mechanical implements of manufacture, and what, if anything, you know about wash-boards and washing-machines?

Ans. I have always taken interest in all new machines that have come under my notice. I will simply say that I commenced using wash-boards when a small boy assisting at washing at home, and have occasionally done the same more or less ever since. Have spent considerable time in trying to make a thoroughly practical washing-machine. Have made several in way of experiments. And am now manufacturing and selling one of my own invention of washing-machines.

177 Int. 5. State whether you have examined complainants' letters patent, Exhibit A, and the board described and claimed therein.

Ans. I have.

Int. 6. Look upon the board shown you (Exhibit one) and state of what you find the same to essentially consist.

Ans. The prominent feature is a succession of ridges across the frame, with slight depressions in the transverse ridges with small projections in

what would be the valleys between the ridges if those projections were not in them.

Int. 7. In what does such transverse ridging divested of the depressions and projections mentioned differ from that of Exhibit 2?

Ans. I am not able to see any difference.

Int. 8. What function, if any, in your judgment do the depressions in the top of the ridges of Exhibit one, perform, if any, in the process of washing?

Ans. I would say very slight, if any; I cannot see that they really facilitate the process of washing or add to the resisting surface over which the clothes pass; rather diminishes it.

Int. 9. State what operation, if any, have the projections C in the process of washing.

Ans. Nothing; being below and out of the reach of contact with articles being washed.

Int. 10. State whether or not you find in said board, Exhibit 1, a washing surface longitudinally and transversely grooved.

Ans. I do not.

Int. 11. State whether or not you find on the said board longitudinal ribs or corrugations.

Ans. I do not.

Int. 12. How long have you known a board of the construction and character of Exhibit 2?

Ans. Twenty years or more, I should think.

Int. 13. How long since you first knew the mode of crimping the zinc in Exhibit 2?

Ans. I can't state with any certainty as to the time. Quite a num-
178 ber of years, and I can't call to mind now when I first saw them made or manufactured—perhaps ten years.

Int. 14. What was the mode of crimping at that time?

Ans. By a stamp or passing between two rollers having corrugated surfaces. The short way to put it is to stamp it between two corrugated surfaces.

Int. 15. Look upon Exhibit C, and state wherein it differs, if at all, from Exhibit 1.

Ans. Exhibit C shows a double ridged surface, the ridges running diagonally across the surface increasing the resisting surface by the amount of curved form of the diagonally ridged surface.

Int. 16. Do you mean that in the respect referred to Exhibit C differs from Exhibit 1?

Ans. I do.

Int. 17. Do you find in Exhibit C projections *c* referred to in complainants' patent?

Ans. I do not.

Int. 18. State whether in your judgment Exhibit 1 differs more or less from Exhibit 2 than Exhibit C differs from Exhibit 1, reference being had to the conformations of the washing-surface.

Ans. Exhibit C differs more from Exhibit 1 than 1 differs from Exhibit 2.

Cross-examined:

Cr.-int. 1. Are not the Exhibits 1 and C both double-crimped boards?

Ans. I should say no. I only give it as my judgment, the smaller impression of Exhibit 1 being too slight to be considered crimped.

Cr.-int. 2. Are not the longitudinal marks or indentations made in the same machine as the transverse one?

Ans. I think so.

Cr.-int. 3. Is not that machine usually known as a crimping-machine?

Ans. I suppose so.

179 Cr.-int. 4. Then would it not be proper in common parlance to call the indentations, whatever the depth may be, that are produced by this machine crimps?

Ans. In a qualified sense, yes.

Cr.-int. 5. Has not the zinc portion of Exhibit 1 been twice through the crimping-machine, the two passages of the zinc being in different directions?

Ans. I judge so by the appearance of the zinc.

Cr.-int. 6. Has not the zinc portion of the board Exhibit C also been twice through in different directions?

Ans. I think so.

Cr.-int. 7. Do you see any indication or marks on the zinc of Exhibit 2, which would indicate that that had been twice through the crimping machine?

Ans. I do not.

(5 and 6 objected to as immaterial.)

Cr.-int. 8. Does not the depth of the crimps in this class of boards depend upon two things; first, the size or depth of flutes in the plates or rollers, and second, on the adjustment of the space between the two when in operation?

Ans. I think so.

Cr.-int. 9. Is not the difference in the depth of the ridges or corrugations in the board Exhibit 1 solely due to the adjustment of the space between the rollers between the first and second operation?

Ans. I think so.

Cr.-int. 10. So far as the depth of the corrugation is concerned, is not the principal difference between the boards Exhibit 1 and C due to the fact that the first and second operations in the board Exhibit 1 are of different adjustments of the space, while the board C has both lines of corrugations made at the same adjustment?

Ans. I think that is true.

AMOS FASSETT.

WILLIAM CAVERT, aged 39; residence, Sterling; occupation, machinist.

Int. 3. State your means of becoming acquainted, if any, with manufactures in wood and iron; how long, if at all, you have been familiar with such manufactures, and particularly in the matter of wash-
180 boards?

Ans. My means of becoming acquainted has been by a practical experience of about 22 years. In wash-boards, my first practical knowledge of wash-boards was fifteen years ago. I have never manufactured any.

Int. 4. State your experience, if any, in wash-boards.

Ans. I bought a lot of wash-boards about that time for the purpose of selling them.

Int. 5. In what respect did they differ from Exhibit 2?

Ans. In not any, unless it was that the crimp was possibly a little finer.

Int. 6. Look upon Exhibit 1, and state wherein its washing-surface differs from that of Exhibit 2.

Ans. Practically it might not differ any, that is, to be noticed in washing, provided both boards were of the same crimp or fineness in its transverse ridges.

Int. 7. What apparent difference is there, if any, in the crimp of Exhibits 1 and 2?

Ans. What makes it look different is by Exhibit 1 being run through the rollers twice.

Int. 8. You infer that, I presume, from indications you find on the surface; state what are those indications.

Ans. Those indications are an indentation upon the top of the crimp, and with corresponding projections in the bottom.

Int. 9. What portion of the washing-surface of the two exhibits last named, and of all wash-boards transversely ridged, is actually employed in the process of washing as a rubbing-surface?

Ans. The upper side of the transverse crimp.

Int. 10. What operation, if any, has the indentations in the ridges in Exhibit 1 in such process?

Ans. If any, they would have a tendency to reduce the rubbing-surface.

Int. 11. What effect in such process would the projection *c* have?

181 Ans. I don't see that they would have any particular effect on washing.

Int. 12. In your acquaintance with boards, such as Exhibit 2, have you known them to be of different sized crimps?

Ans. I have.

Int. 13. In such acquaintance have you known wash-boards having a wooden washing-surface substantially of the same conformation as that of Exhibit 2?

Ans. I have.

Int. 14. How long since, and were they in general use?

Ans. Probably 20 years, so fa. as I know they were in general use at that time.

Int. 15. From your knowledge of the state of the art for the last 10 years, can you tell whether or not zinc and wood during that time were well known equivalents as the washing-surface in wash-boards?

Ans. Yes, sir; they were.

Int. 16. Look upon Exhibit C and state the difference between it and Exhibit 1, in respect to their washing-surfaces?

Ans. Well, I find in Exhibit C more washing-surface than there is in Exhibit 1. In Exhibit C it would have a tendency to give the clothes a lateral motion, where in Exhibit 1 it would not.

Int. 17. State whether you find in Exhibit 1 either longitudinal grooves or longitudinal ribs or corrugations.

Ans. I do not.

Int. 18. What would be your definition of a groove?

Ans. Such as made in flooring when matched.

Int. 19. State whether in your judgment the difference between Exhibit 1 and Exhibit 2 is greater or less than that between Exhibit 1 and Exhibit C, reference being had to their respective washing-surfaces?

Ans. If Exhibits 1 and 2 were of the same crimp as to fineness there would be more difference between 1 and C than 1 and 2.

182 Int. 20. Look upon Exhibit 13, and state the difference between it and Exhibit 1, and Exhibit 1 and Exhibit C.

Ans. There is more difference between Exhibits 1 and C than 1 and 13.

Int. 21. You may state what constitutes the rubbing surface of C.

Ans. The two upper surfaces of the diamond projection.

Cross-examined:

Cr.-int. 1. How is the zinc portion of Exhibit 13 formed?

Ans. By passing through grooved rollers.

Cr.-int. 2. Has it been passed through more than once, or in one direction?

Ans. It has not.

Cr.-int. 3. How are the zinc portions of Exhibits 1 and C formed?

Ans. By passing through twice.

Cr.-int. 4. Does not the depth of the groove depend upon the size of the flutes on the rollers and the adjustment of the space between them?

Ans. It does.

Cr.-int. 5. Then, without reference to the direction of the line of crimping, is not the difference between the zinc portion of the boards 1 and C simply the difference between the adjustment of the rollers while the zinc was being passed through them?

Ans. Yes, sir.

Cr.-int. 6. While it may be true that a single or disconnected diamond projection will present more surface to a piece of cloth passing over it, is it not a fact that where you have about 800 in the space shown by the board Exhibit C, there is in fact an equal, if not a greater, amount of lost rubbing surface than there is a board crimped like Exhibit 1?

Ans. I would think you would get the greatest rubbing surface in Exhibit C, the distance between the extreme points of the diamonds laterally in Exhibit C being so much greater than the distance between the indentations in Exhibit 1.

WILLIAM CAVERT.

183 SAMUEL GOULD; 38 years old; occupation, mechanic; residence, Osgood, Indiana.

Int. 3. State your means and extent of information in mechanics generally, and particularly your familiarity, if any, with wash-boards; state fully.

Ans. Well, I have been engaged as a mechanic for 18 years myself—model working, joiner work, &c. I have had some experience in wash boards. It consisted in experimenting and getting up different styles of crimps for wash-boards. I am the patentee of the serpentine-crimp wash-board, patented January 30th, 1877.

Int. 4. Look upon Exhibit 10 and Exhibit 1, and state what features you find them to have in common.

Ans. Well, my judgment would be that they are one and the same thing substantially.

Int. 5. State whether or not you find in each raised projections.

Ans. I do.

Int. 6. How are those projections bounded, if at all?

Ans. They are bound by depressions on either side.

Int. 7. Are the sides and ends of such projections in either or both angular or sloping?

Ans. Well, in this board Exhibit 10 they are sloping at the ends. The sides of the projections are rounded as I see them. Exhibit 1 appears to be more square on the side of the projection.

Int. 8. What do you mean by more square?

Ans. Coming up to a sharper point at the top.

Int. 9. The inquiry is not as to the shape of the tops of the projections, but as to whether its sides and ends are sloping or angular?

Ans. They would be sloping.

Int. 10. Where is the rubbing surface of the projections on Exhibits 1 and 10?

Ans. It would be on the upper portion of the projections of both boards.

Int. 11. In what direction would such rubbing surface be relative to the direction of the rubbing or movement of the clothes?

184 Ans. It would be at right angles with the downward motion in both Exhibits 1 and 10.

Int. 12. Look upon Exhibit 8 and Exhibit C, and state whether you find in either or both of them metallic raised projections.

Ans. I do in both.

Int. 13. What is the shape of such projections in either or both the last-named boards?

Int. It is diamond shaped in both boards.

Int. 14. How are the diamonds in each located as to each other on the same boards?

Ans. The diamonds in C run diagonally. The longest diameters of the diamonds are cross-ways of the board in both.

Int. 15. Where is the rubbing surface of the projections in the two last-named boards?

Ans. It is on the extreme upper portion of the diamond shape, and on the angular sides of the upper portion of the diamonds.

Int. 16. State whether in your judgment Exhibit C resembles Exhibit 8 more or less than it resembles Exhibit 1, reference being had to the general conformation of their respective washing surfaces.

(Objected to as incompetent and immaterial, the complainants' patent not being a design patent.)

Ans. I think it does resemble 8 more than it does Exhibit 1.

Int. 17. Look upon Exhibit 12, and state what, if anything, you find therein similar to the rubbing surface of Exhibit 1.

Ans. I find the rubbing board of No. 12 having the appearance of No. 1; that is, a resemblance to No. 1.

Int. 18. In what does this resemblance consist?

Ans. In the projections having the appearance of No. 1. I should have said the projections bounded as in No. 1, by depressions.

Int. 19. How long since you have known such boards as Exhibit 2 to have been in general use?

Ans. I would say 20 years I have known this.

Int. 20. When, if ever, have you seen such boards manufactured?

185 Ans. About 16 years ago, as near as I can remember, I have seen such boards manufactured.

Int. 21. How, if you remember, was the zinc of such boards crimped?

Ans. Crimped between a pair of corrugated rollers.

Int. 22. Have you seen the rollers employed by the defendants for crimping the zinc of their wash-boards, such as Exhibit C and others?

Ans. I have seen the rollers used by them, and have seen them making boards.

Int. 23. State how the rollers so used by defendant compare in their construction and operation with those you say you saw about 16 years ago.

Ans. They are just the same with the exception they were a little better manufactured.

Cross-examined:

Cr.-int. 1. When and where did you make your experiments in crimping zincs for wash-bo'rds?

Ans. At Osgood, Indiana, in the winter of 1875 and 1876.

Cr.-int. 2. Are you any way connected with or in the employ of the Sterling Pump Company?

Ans. I am interested in an article they are manufacturing.

Cr.-int. 3. Are they manufacturing your patented wash-board?

Ans. No; they are not.

Cr.-int. 4. To what end or purpose did you make your crimping experiments?

Ans. It was to see what kind of an angle I could get for a serpentine crimp.

Cr.-int. 5. Did you experiment sufficiently to determine whether sheet zinc could be practically crimped into the form shown in Defendant's Exhibit 10; and, if so, what would be your opinion as to practically crimping boards in that form in sheet zinc?

Ans. No; I did not. I have no definite opinion as to its practicability as to that stamp.

186 Cr.-int. 6. If the rubbing surface is at right angles with the line of movement in the Exhibit 10, why is it not in the Exhibit C, defendant's boards?

Ans. The bearing of the goods in Exhibit 10 is on a transverse line, while the bearing of the goods is on the angular side of the diamond in Exhibit C.

Cr.-int. 7. Would not surplus water, or any water left free, flow down the board Exhibit 10, on diagonal lines, the same as in Exhibit C?

Ans. I think not.

Cr.-int. 8. Would it flow down in straigh' lines, as in Exhibit 1?

Ans. No, sir.

Cr.-int. 9. Does the rubbing board in Exhibit 12 have any other function or office than that of gripping or holding cloth, the same as the hands hold it in using the complainants' or defendant's boards.

Ans. It has no other office, you might say, particularly.

Redirect-examination:

R. D. int. 1. Do you or do you not understand that the rubbing board in Exhibit 12, in the process of washing passes more or less over the clothes?

Ans. It can be used so as to pass over the clothes, or to hold them the same as the hand, either way.

Recross-examination:

Int. 1. Do you mean as a matter of possibility, or as a matter of fact in a device where the wash-board is composed of freely revolving and independent rollers, like this Exhibit 12?

Ans. I mean as a matter of possibility.

SAMUEL A. GOULD.

ANDREW J. UPHAM; age 29; residence at Sterling.

Int. 2. State what you have had to do in the last years with mechanics, patents, and patented improvements in mechanics.

Ans. I have obtained 6 patents in machines and articles of manufacture. Have been working more or less for 5 or six years in mechanics.

187 Int. 3. Look at the board Exhibit 1, and state of what its rubbing surface consists.

Ans. I should say it consists of transverse ridges.

Int. 4. What other features do you find on such rubbing surface?

Ans. I find these indentations on the top of the ridges; also projections from below in the bottom of the groove.

Int. 5. Look upon Exhibit C, and state what ridges; if any, you find on its rubbing surface.

Ans. I find two kinds of ridges running diagonally; I don't find any running transversely.

Int. 6. What, if anything, do you find corresponding to the depressions on the ridges you referred to on the other board?

Ans. I don't find any.

Int. 7. What, if anything, do you find corresponding to the projection *c*, in the the interlying grooves of complainant's board?

Ans. I do not find any such projections in Exhibit C, defendant's board.

Int. 8. State the difference, in your judgment, between complainants' board and the ordinary transversely ridged zinc wash-board.

Ans. The difference is that this board (complainants' board), has depressions on the tops of the ridges, and has projections from the bottom of the groove. That is all the difference I see.

Int. 9. In your judgment are those two features, the depressions on the ridges and the projections in the bottom of the grooves, operative in the process of washing?

Ans. The top depressions might operate in the discharge of water, the lower do not perform any function at all in washing.

Int. 10. Do you think that on a board of the transverse crimp of Exhibit 1, there would be any danger of the board retaining surplus water without the indentations on the top of the ridges?

Ans. I would not think it would hold enough water to impede the process of washing.

Int. 10¾. Can you state, then, any practical advantage which the crimp in complainants' board would have over the well known crimp as shown in Exhibit 2?

188 Ans. This board, Exhibit 1, might be an advantage in the depressions in the top of the ridges; they might let the water off of the board a little freer.

Int. 11. What complaints, if any, did you ever hear that the water did not get off the board Exhibit 2 freely enough?

Ans. I never heard any complaint.

Int. 12. State what difference, if any, you find between the conformation of washing surface of defendant's board and that of Exhibit 2.

Ans. There is a good deal. Exhibit 2 is ordinarily ridged, and Exhibit C is ridged two ways diagonal with the frame of the board; and if it is an advantage to have the water flow off, this Exhibit C has a good delivery.

Int. 13. State whether, in your judgment, there is more or less difference between the configuration of the washing surface of Exhibit 1 (complainants' board) and the old board, Exhibit 2, than there is between that of defendant's board and complainants'.

Ans. I should think there was more difference between defendant's and complainants' in appearance.

Int. 14. What substantial difference is there in shape, if any, between the projections on Exhibit 10 and those of complainants' board?

Ans. The projection in Exhibit 1 comes to a sharp point or sharper edge, but projections on Exhibit 10 are surrounded by a vall'y or depression, and the tops of the depressions are more round.

Int. 15. State whether or not you find in Exhibit 10 metalic projections having sloping sides and ends, and bounded each by depressions.

Ans. Yes, they are all that way, except the end ones.

Cross-examined:

Cr.-int. 1. Do you think a board like Exhibit 10 could be practically made of sheet zinc?

(Question objected to, for the reason that complainants' claims are not for sheet zinc wash-board.

Ans. No, unless you make it twice as heavy.

Cr.-int. 2. Is not the channel which surrounds the projection on
189 the Exhibit 10 a continuous channel around each one of them, taking the word channel to be a proper word for the depression?

Ans. Yes.

Cr.-int. 3. Are not the ridges in defendant's board, Exhibit 2, cut into small projections by cross crimping?

Ans. I could not say how they are done; I never saw it done.

Cr.-int. 4. Are there in that board any ridges across in any direction that are continuous without being cut into projections by the cross-ridges?

Ans. I don't find any.

Cr.-int. 5. Are not the transverse ridges in complainants' board, Exhibit 1, cut into small projections by cross indentations, having corresponding projections from the under side?

Ans. In making indentations longitudinally you have small projections.

Cr.-int. 6. Do you find the transverse ridges of Exhibit 2 in any manner formed into smaller projections by any cross lines?

Ans. No, sir, I don't.

Redirect examination:

R. D. int. 1. Are those parts of the transverse ridges in complainants' board made any higher by the longitudinal series of depressions?

Ans. No.

R. D. int. 2. Are the parts of the ridges between such depressions caused in any sense to project more than before by making the said depressions?

Ans. No.

ANDREW J. UPHAM.

JOHN D. TRACY; aged 42; occupation, president Sterling Manufacturing Company; residence at Sterling.

Int. 3. State what means, if any, you have had of becoming acquainted with mechanics and the subject matter of patents, in mechanics.

Ans. I went as an apprentice when I was 16 years old, to the machinist business, and I worked at that and manufacturing nearly all the time, till the present. I have made several applications for patents,
190 part of them jointly with others, mostly agriculture implements or improvements on agricultural implements.

Int. 4. State whether or not you have had charge of any shop or manufacturing previous to your present position; and, if so, when, where, and how long.

Ans. I was superintendent of a shop in Bridgeport, Connecticut, 3 years, and was foreman of a shop in Providence, Rhode Island, six years before I came here. I was foreman 9 months in the Chicago and Rock Island car shops, in Chicago.

Int. 5. Look upon the wash-board now shown you, of complainants, and state of what you find its washing surface to essentially consist.

Ans. I should call it horizontal ridges extending across the board.

Int. 6. In what, if at all, do you find the configuration of such surface to differ from that of the ordinary well-known wash-board?

Ans. There are parts of the ridges that are pressed down, and parts of the grooves filled up, or partly filled.

Int. 7. What practical effect, if any, is, in your judgment, attained in these depressions on the summit of these transverse ridges and the projections from below in the interlying grooves, for the purposes of a wash-board?

Ans. I should think they would detract from it if there was any effect.

Int. 8. What would you understand by the phrase, a longitudinal groove, spoken in reference to the washing surface of such a board?

Ans. I should call it a groove running the longest way of the board.

Int. 9. Extending how far?

Ans. Well, I should say it might be the whole length of the board or nearly the whole length.

Int. 10. What would you understand under like circumstances by the term longitudinal ribs or corrugations?

Ans. I should consider that continuous elevations running lengthways of the board, to the extent of the rubbing surface.

Int. 11. Do you find on complainants' board either longitudinal grooves or longitudinal ribs or corrugations?

Ans. No, sir.

191 Int. 12. Premising that the complainants in this case claim a sheet-metal wash-board, having a series of raised projections, *b*, each bounded by longitudinal and transverse grooves or depressions, look upon Exhibit 10, and state what, if anything, you find upon its rubbing surface answering to such description.

Ans. I should call their rubbing surfaces very nearly the same, identically the same.

Int. 13. Do we understand you that you find such projections on Exhibit 10?

Ans. Yes, sir.

Int. 14. How do such projections on both boards lie in relation to the movement of the clothes in washing?

Ans. Crosswise, at right angles.

Int. 15. State in what direction such projections on both boards have their longest diameter?

Ans. Crosswise or at right angles with the board.

Int. 16. State whether or not, in your judgment, there is any principle involved or function put in operation in complainants' board, which is not involved and operated in Exhibit 10.

Ans. I don't see any.

Int. 17. Look upon defendant's board, and state of what you find its washing surface essentially to consist?

Ans. A series of diagonal surfaces.

Int. 18. What ridges, if any, do you find on the last-named board?

Ans. Ridges running diagonal of the board, two series.

Int. 19. At about what angle, if at all, do these two series of ridges intersect each other?

Ans. I should call it about 35 to 37 degrees, that is the acute angles.

Int. 20. State whether you find projections on defendant's board; and, if so, the shape thereof.

Ans. Diamond shaped projections. The highest point nearest the upper side.

Int. 21. What side or sides of such projections would form the washing or rubbing surfaces?

192 Ans. The two upper sides.

Int. 22. What proportion, therefore, of rubbing surface would there be between complainants' and defendant's board on the same area?

Ans. Very near double in defendant's.

Int. 23. State whether, in your judgment, the difference between complainants' board and the ordinary wash-board is greater or less than that between defendant's board and complainants'?

Ans. I should call it less.

Cross-examined:

Cr.-int. 1. Please explain your reasons for concluding that the defendant's board has nearly double the rubbing surface of the complainants'.

Ans. By the angle of the rubbing surfaces.

Cr.-int. 2. In our examination yesterday, it was ascertained that there were 840 projections on each board, complainants' and defendant's; understanding that to be correct, would you still think that one had nearly double the rubbing surface of the other?

Ans. Yes, sir.

Cr.-int. 3. What proportion of the transverse or cross ridges of the complainant's board is thrown down by the cross-crimping so as to be practically out of use as a rubbing surface?

Ans. About one-fifth.

Cr.-int. 4. The remaining four-fifths is left in the same horizontal plane or at the same height, is it not?

Ans. Very near, practically.

Cr.-int. 5. Do not the projections in defendant's board present in their transverse section a central apex, shading off to nothing on each side?

Ans. No, sir.

Cr.-int. 6. Why not?

Ans. Well, they strike the next diamond nearly at the top.

Cr.-int. 7. Will you please take time to measure and give us the length of the ridges in one direction produced into a single ridge in defendant's board?

193 Ans. I have measured the same and find it to be 30 feet and 5 inches.

Cr.-int. 8. In rubbing lengthways of defendant's board, owing to the rearward depressions, as well as lines of the projections, is there not as a matter of fact, in considering elevation as well as line, less rubbing surface, or surface that comes in actual contact with the goods in the defendant's board, than there is in the complainant's?

Ans. No, sir; I should think not.

Cr.-int. 9. With the rapid motion given to the goods in washing, and the strain which the friction and pressure puts upon them, are not the goods practically in a straight line, or even plane at the bottom after they have been moved an inch or so, or a sufficient distance to bring the strain of the friction into operation?

Ans. I should say that in pushing the clothes they would strike nearly the whole of that surface. There is a place at the bottom where they might not touch.

Cr.-int. 10. Have you had any practical experience in washing with this kind of board?

Ans. No, sir.

Cr.-int. 11. Have you ever read the complainants' patent?

Ans. No, sir.

Cr.-int. 12. Do you find in Exhibit 10 any projections having angles of any kind; are not all of the variations from the plane of the original surface circles or curves?

Ans. Some of them are angles, most of them are curves.

Cr.-int. 13. Where are the angles?

Ans. The angles are at the bottom.

Cr.-int. 14. Would those angles have any operation as a rubbing surface?

Ans. I think not.

Cr.-int. 14½. The boundaries of the projections in that Exhibit 10 are curves to a greater or less degree, are they not?

Ans. Not wholly.

Cr.-int. 15. What portions are not curved?

194 Ans. The small portion; it is hard to tell what shape they are intended to be from variations in this model.

Cr.-int. 16. Are not the depressions bounding each projection on that model Exhibit 10 continuous or extending clear around each one?

Ans. I should say they were.

Cr.-int. 17. Do you know how the zin' portions of the boards Exhibits 1 and C are crimped?

Ans. I never seen it done.

Cr.-int. 18. Do you know whether both could be crimped by the same machine?

Ans. I should think they might.

Cr.-int. 19. If a grooving tool was run across an uneven surface so that the groove formed was broken, or lost in places, would it not be proper to call the result a groove, in common parlance?

Ans. It would depend upon the frequency of its hitting the irregularities and the amount cut out of them.

Cr.-int. 20. Would you not consider it to be a reasonable use of language to call the longitudinal lines of indentations in the complainants' board grooves, considering the fact that each indentation in the line was made by the same tool at a single operation?

Ans. No, sir.

Cr.-int. 21. Why not?

Ans. There is less of the indentation than the part it did not strike.

Cr.-int. 22. If the fluting rollers were left at the same adjustment for forming the second line that they had for the first, would they then be grooves?

Ans. I think they would.

Cr.-int. 23. Then why would it be improper to call the same thing a groove when the rollers were adjusted a little further apart in the second operation?

Ans. Because I do not think it would indent enough to make a groove with the rollers further apart.

Cr.-int. 24. When you hold the complainants' board parallel
195 with the line of vision, instead of across such line, do not the indentations appear to the eye to be grooves?

Ans. They do in that position.

Cr.-int. 25. Do you think if you owned the complainants' patent, and had called those indentations grooves, such a name would be fatal to a patent?

Ans. Not the word grooves, I shouldn't.

Cr.-int. 26. What do you understand the word corrugation to mean, mechanically?

Ans. As applied to a piece of sheet metal, bent both ways, forward and back, to form hollows and ridges.

Cr.-int. 27. If you were to lay a pane of glass upon the rubbing surface of each board, 1 and C, would it not come in contact with more metal in 1 than it would in C?

Ans. As to that I suppose it would strike more on complainants' board, Exhibit 1.

Redirect examination:

Rd. D. int. 1. State the aggregate length of ridge in defendant's board, aggregating both series of ridges.

Ans. About $54\frac{3}{4}$ feet.

JOHN D. TRACY.

NORMAN CLARK; age 46; occupation, watchmaker; reside in Sterling.

Int. 3. State what means, if any, you have had of becoming acquainted in mechanics, and the subject-matter of improvements therein.

Ans. I have spent my whole life since the time I was 14 in making and in working in machinery of various kinds; I have taken out several patents, and have endeavored to inform myself on all new machinery I have come across, and the products of the same.

Int. 4. Look upon the complainants' board, Exhibit 1, and state wherein its washing surface differs from that of the ordinary board, as shown in Exhibit 13.

Ans. The notches or depressions in the top are all that I notice; also the projections in the bottom of the grooves.

Int. 5. What practical effect, if any, would either of the variations named have in process of washing?

196 Ans. I don't think that would expedite the business at all, what I see of it.

Int. 6. In regard to the lower projections called *c*, of what use are they?

Ans. I don't see that they are of any practical use. I can't conceive of any.

Int. 7. There has been something said by a witness for the complainant as to these projections *c* stiffening the zinc; what is your judgment in that respect?

Ans. When the zinc is out of the board it stiffens it at the tops and bottoms of the ridges, but half way between it has no effect; when in the board, and supported by the board, I don't see that it is of any use at all as far as stiffening it is concerned.

Int. 8. State where, if at all, you find on the ridges of complainants' board a plain surface extending transversely the full width of the zinc.

Ans. Half way down the side of each ridge the zinc is perfectly plain, and would bend as readily as though it was not indented.

Int. 9. State whether the zinc, corrugated in the manner of complainants', would be sufficiently *rid*gid for a washing surface without a support at the back.

Ans. I should say it would not, and is not as strong as it would be without the indentions at the top and bottom of the ridges.

Int. 10. What, in your judgment, advantage or improvement is there in complainants' washing surface over that of Exhibit 13?

(Question objected to, for the reason that the Exhibit 13, or boards as finely fluted, are not older than the patent.)

Ans. There may be some advantage in practice; I don't see what it could be.

Int. 11. Look upon defendant's board, and state in what you find its washing surface to consist.

Ans. In diagonal ridges crossing each other at regular intervals.

Int. 12. State whether you find projections thereon; and, if so, the shape thereof.

Ans. They seem to be diamonding in shape, but still connected
197 together on the upper lines, so they are not distinctly formed into diamond projections.

Int. 13. State whether you find depressions in the top of the ridges such as complainants', or projections from below, as in complainants' board.

Ans. I see neither.

Int. 14. What effect, if any, different from that produced by the surface of complainants' board, would be caused by the peculiar conformation of defendant's board during the process of washing?

Ans. The depressions in defendant's board and rid'es being diagonal, the working surface converging and diverging, it would have a tendency to press the fabric together and separate it laterally as it passed every point in the converging lines, and would facilitate the process of washing, in my opinion. That is the advantage which I see in the diagonal lines.

Int. 15. Which has the greater washing surface, complainants' or defendant's board; and what is the amount of difference, if any, speaking approximately?

Ans. Perhaps one-third more in defendant's board.

Int. 16. State whether the difference in configuration of washing surface is greater or less between complainants' and defendant's boards than between complainants' and the ordinary board, Exhibit 2.

Ans. I think there is more difference between complainants' and defendant's than between complainants' and the ordinary board, Exhibit 2.

Int. 17. The first claim of complainants' patent is read to the witness, and he is asked if he finds anything in Exhibit 10 answering to the conditions of said claim.

Ans. Those are not the terms I should use in describing this board.

Int. 18. In what way are they inapplicable?

Ans. This patent description, 1st claim, would apply to projections in right lines.

Int. 19. Leaving out of view all difference in the size of the projections in the respective boards, what practical difference, if any, is there between the rubbing surfaces of Exhibit 10 and complainants' board?

198 Ans. The working surface is exactly the same in each, if they were the same size, perhaps a little more rounded in ten, but differently arranged.

Int. 20. Look upon Exhibit 12, and state what, if anything, you find there resembling any of the boards about which you have been interrogated.

Ans. This rubbing board seems to be nearly the same as complainants' board.

Int. 21. Do you find in defendant's board any longitudinal or transverse grooves?

Ans. No, sir.

Int. 22. Or any projections bounded by such grooves?

Ans. No, sir.

Cross-examined:

Cr.-int. 1. In what direction is the power applied, to wash-boards like those in controversy, when in use?

Ans. By pressure on the board the clothing is passed up and down.

Cr.-int. 2. Is not the strain on the zinc about the same endwise that it is downward?

Ans. I think there is little strain upon the zinc in any direction when it rests upon the back.

Cr.-int. 3. Have you ever had occasion to observe worn out or used up wash-boards of the form of Exhibit 2?

Ans. I have.

Cr.-int. 4. Where did they give out?

Ans. Those that I have seen were worn through but not broken down.

Cr.-int. 5. Did you ever see any that were used up by being cracked?

Ans. I think they were after being pretty well worn.

Cr.-int. 6. Is not such cracking due to a slight movement caused by working up and down on the face?

Ans. Those that I have seen were worn through, or nearly
199–200 through, on the surface in the central part and then cracked lengthwise of the ridge and at the top.

Cr.-int. 7. Would not the indentations of the complainants' board check the tendency to crack along that line and add something to the life of the board?

Ans. I think it would.

NORMAN CLARK.

Defendant further offers certified copy of part of complainants' model now in the Patent Office forming part of the application on which said letters patent of complainants issued, marked Exhibit 15.

Also the following letters patent of the United States in wash-boards, from printed volumes, to wit:

Ira S. Parker, dated January 15th, 1856, number 14111.
Royal Hatch, dated April 8th, 1856, number 14638.
John K. O'Neil, dated January 18th, 1859, number 22667.
Warren Hill, dated August 6th, 1861, number 32994.
George Whitford, dated August 20th, 1861, number 33118.
Joseph Hyde, dated August 1st, 1854, number 11426.
S. J. Babbit, dated January 7th, 1862, number, 34046.
Nelson Homes, dated April 11th, 1865, number 47206.
A. P. Barlow, dated October 22nd, 1861, number 33511.
Ashman Hall, dated July 28th, 1863, number 39343.
G. H. Kidney, dated September 30th, 1862, number 36568.

201 I, Henry W. Blodgett, judge for the district court of the United States in and for the northern district of Illinois, hereby certify that on the hearing of the above-entitled cause before me, sitting as judge of the circuit court of the United States in and for said northern district of Illinois, the above and foregoing evidence was offered and introduced, and that the same was and is all the evidence that was introduced by each and both of the parties to said cause.

In witness whereof I have hereunto set my hand and affixed my seal this 10th day of September, A. D. 1879.

H. W. BLODGETT, *Judge.*

(Endorsed:) Filed November 10, 1877. Wm. H. Bradley, clerk.

202 Afterwards, to wit, on the 5th day of January, A. D. 1878, in the record of the proceedings of said court in said entitled cause, be-

fore the Hon. Henry W. Blodgett, district judge, is the following entry, to wit:

MRS. PETER DUFF ET AL.
v.
THE STERLING PUMP COMPANY. } In chancery.

Now come the complainants, by West and Bond, their solicitors, and pray an appeal herein to the Supreme Court of the United States, which is allowed upon giving bond herein in the penal sum of fifteen hundred dollars, with security to be approved by the court.

203 Afterwards, to wit, on the 22d day of January, A. D. 1879, said complainants, by their solicitors, filed in said clerk's office their appeal bond in said entitled cause, which said bond is in the words and figures following, to wit:

Appeal bond.

Supreme Court of the United States.

MRS. PETER DUFF ET AL.
v.
THE STERLING PUMP COMPANY. } In equity.

Appeal bond.

Know all men by these presents that we, Mrs. Peter Duff, Robert Duff, Edward Kitzmiller, and The Union Manufacturing Company, and Lester L. Bond, are held and firmly bound unto The Sterling Pump Company in the sum of one thousand five hundred dollars, to be paid to the said company, its successors or assigns; to which payment well and truly to be made, we bind ourselves and each of us, jointly and severally, and our, and each of our, heirs, executors, and administrators, successors and assigns, firmly by these presents. Sealed with our seals and dated this 15th day of January, A. D. 1878.

Whereas the above-named Mrs. Peter Duff, Robert Duff, Ed-
204 ward A. Kitzmiller, and The Union Manufacturing Company have appealed to the Supreme Court of the United States to reverse the judgment rendered and decree entered in the above-entitled suit by the circuit court for the northern district of Illinois: Now, therefore, the condition of this obligation is such that if the said Mrs. Peter Duff and others, complainants and appellants, shall prosecute their said appeal to effect, and answer all costs if they shall fail to make good their appeal, then this obligation shall be void; otherwise the same shall be and remain in full force and virtue.

MRS. P. DUFF. [SEAL.]
ROB'T P. DUFF. [SEAL.]
E. A. KITZMILLER. [SEAL.]
LESTER L. BOND. [SEAL.]
UNION MAN'F'G CO., [SEAL.]
R. S. JANNEY, *Pres't.*

Signed and sealed in presence as to the signatures of all these—
WM. MCKOWN.
H. D. BEEHRMAN.

As to the signature of The Union Manufact'g Co.—
WILLIAM F. PRUYSE.
EASTBURN REEDER.

Approved.

H. W. BLODGETT, *Judge.*

(Endorsed:) Filed February 22, 1879. Wm. H. Bradley, clerk.

205 NORTHERN DISTRICT OF ILLINOIS, *sct:*

I, William H. Bradley, clerk of the circuit court of the United States for the northern district of Illinois, do hereby certify the above and foregoing to be a correct and complete transcript of the record of all the proceedings had in said court in the cause wherein Mrs. Peter Duff et al. are the complainants and The Sterling Pump Company is the defendant, as appears from the files and records of said court now remaining in my custody and control.

In testimony whereof I have hereunto set my hand and affixed the seal of said court, at my office, in Chicago, in said district, this 24th day of September, A. D. 1879, and of our Independence the 104th year.

[SEAL.] WM. H. BRADLEY, *Clerk.*

(Indorsement on cover:) No. 187. Mrs. Peter Duff, Robert Duff, Edward A. Kitzmiller, and The Union Manufacturing Company, appellants, vs. The Sterling Pump Company. N. Illinois C. C. U. S. Filed 23rd February, 1880.

2699——8

17-636

IN THE

SUPREME COURT OF THE UNITED STATES.

IN EQUITY.

MRS. PETER DUFF et al., *Appellants,*

vs.

THE STERLING PUMP CO., *Appellee.*

NO. 187.

BRIEF AND ARGUMENT FOR APPELLANTS.

L. L. BOND,

Of Counsel for Appellants.

CHICAGO:

HORACE O'DONOGHUE, BRIEF AND ABSTRACT PRINTER, 95-97 WASHINGTON ST.

1883.

IN THE

Supreme Court of the United States.

IN EQUITY.

MRS. PETER DUFF et al.,
Appellants,

vs.

THE STERLING PUMP CO.,
Appellee.

NO. 187.

BRIEF AND ARGUMENT FOR APPELLANTS.

BRIEF.

This suit is brought on reissue letters patent, No. 6,673, dated October 5, 1875, to appellants, Mrs. P. Duff, E. A. Kitzmiller, and R. P. Duff, of Pittsburgh, assignees of Wesley Todd, to whom the original patent was granted February 7, 1871, for an improvement in wash-boards.

The Union Manufacturing Company, of Toledo, is the exclusive licensee, while the Pittsburgh parties hold the legal title.

There is no controversy concerning the title, or parties to the suit.

There are no questions of reissue law involved. The answer does not deny the identity of the reissue and the original patents.

The original patent is not exhibited or put in evidence.

There was no written opinion filed in this cause, and there is, therefore, no opinion made a part of the record.

The court below sustained the patent as a valid one, but limited it to lines at substantially right angles to, and parallel with, the frame, and therefore held that the defendant's (appellee's) board did not infringe.

Infringement was claimed on all of the three claims.

POINTS.

The questions or points upon which the appeal is taken are :

1. Whether appellants' patent is, upon its face, limited to lines of projections and grooves running technically parallel with, and at right angles to, its sides.

2. Whether it is so limited by the older art ; and

3. Whether the appellee's board infringes.

The question of infringement will be determined in the main by the answers given to the first and second questions, for both boards are confessedly made by the same process or method, and both confessedly produce the same results, to the extent of the Todd improvements.

The appellee asserts that the board made by it is an improvement on Todd's, and exhibit a later patent to one A. J. Hull, No. 171,568, dated December 28, 1875, which claim and patent will be considered hereinafter.

If the specifications, or the older art, limit the patent to lines specifically parallel with, and at exact right angles to, the side boundaries, then the question of infringement was properly decided as to the first and third claims.

In our opinion, the court below fell into the error of construing the patent too narrowly, by attempting to follow the Patent Office in drawing a line between the two patents, when the true error was committed by the Office in granting Hull a patent, as will appear further on, if the Hull patent covers or indicates appellee's board.

Construction.

The claims of the appellants' Todd patent are :

1. "A sheet-metal wash-board, having a series of "raised projections, B, each bounded by longitudinal and "transverse grooves or depressions, substantially as set "forth.

2. "In a sheet metal wash-board, the projections, "B, each bounded by grooves or depressions, in com- "bination with raised projections, C, in the bottoms of "the interlying groves, substantially as set forth.

3. "As a new article of manufacture, a sheet-metal "wash-board, having a rubbing face, both longitudinally "and transversely ribbed or corrugated, substantially as "set forth."

Longitudinal is defined to be "running lengthwise, "as distinguished from transverse or across, extending in "length."—*Zell.*

Transverse is defined to be "turned or directed "across or athwart; lying or being across or in a cross "direction."—*Zell.*

Lengthwise and crosswise are defined as longitudinally and transversely.

It will be seen from the definitions that longitudinal and transverse do not have any technical meaning and do not mean strictly parallel with the longest boundary or at right angles therewith.

Following the ordinary use of these words, we find that ridges and the grooves or depressions are to run in the direction of length and in the direction of width or across.

The specification states that "the rubbing face "somewhat resembles the face of a rasp or file in general "appearance." In rasps and files the lines are all oblique or sloping.

There is nothing in the specification limiting the patent to lines running exactly parallel with the sides and at exact right angles therewith. The limitation to such exact lines by the court below, on account of anything found in the specification, was an error.

Construction in Reference to the Older Art.

The Todd patent is for improvements made to or on the common fluted zinc wash-board, and these improvements are:

1. Cross-notching or indenting the old ridges for the purposes of strengthening them, permitting a freer downflow of water, and giving the clothing more movement under the hand.

2. Raising cross-ribs in the old grooves or channels to strengthen the board in these places; and

3. Combining this improved metal sheet with such a frame as will adapt its use.

It will be seen that neither of the appellee's exhibits showing the older art has for its foundation or starting point of the improvement the old or common ribbed board. Each one shows an attempt to produce a board which would supersede or drive out this common board.

The doctrine of the survival of the fittest applies more severely in mechanics than elsewhere. The time-tested old board, with the Todd improvements, is still at the head—all attempts to supersede or surpass it have failed, thus showing that Todd built on the true foundation.

We will now consider the relation of the Todd patent to the older art, in order to determine to what extent, if any, the patent is anticipated or limited by it, and we will consider these older patents in the order in which they are inserted in the record.

WITSIL'S PATENT of 1861 shows a wash-board having its rubbing face formed on a plane surface, by making annular depressions or cups, which shall hold water to be pressed through the clothes as they are moved back and forth.

Witsil's board has neither the principle, construction nor operation of the Todd board.

KEECH'S PATENT of 1860 shows an attempt to improve the common wash-board by giving the single ribs or corrugations of the common board a slightly zig-zag direction.

Keech's board bears the same relation to the Todd board, that the old common board does, and no greater, for it is the same thing, and it ends where Todd's begins.

THE BELLUS AND BOWERS PATENT shows a wash-board made by driving a lot of brass-headed or round headed tacks into a plane surface.

The Bellus and Bowers board has neither the principle, construction, nor operation of the Todd board, and it has no relation to the Todd improvements, as the Todd improvements could not be applied to it or to any other board of similar construction.

CRIHFIELD'S PATENT shows a series of diamond shaped pyramidal projections, pressed up from the underside of a plane sheet of metal. They are of sufficient size to form rows of only four or five knobs alternating, which, for an ordinary-sized board, would make each one about two inches across at the base.

This board does not and cannot have the Todd improvements, as it has not the foundation upon which to place the Todd improvements.

The Crihfield improvements cannot be applied to, or united with, the corrugations of the common board, which is the foundation upon which the Todd improvements are made.

THE GALUSHA AND SAFFORD PATENT shows a board made of a sheet of metal hammered over a spindle wash-board. The little certified duplicate of the Patent Office model shows, like the original model itself, a brass sheet, brought to the desired form by hammering, and forming one knob at a time. This board cannot be made in any other way, as rolling, crimping, or stamping would tear it to pieces.

See page 24 of the argument and the testimony there quoted.

This Galusha and Safford patent shows another board, produced for the purpose of superseding the old common wash-board, instead of attempting to improve it.

It does not have the Todd improvements. It cannot be formed on or with the common wash-board, and it has no relation to the kind of board improved by Todd.

THE LASH PATENT shows a rolling spindle wash-board, and it is like the old spindle board sometimes seen, except that the spindles are put crosswise so as to roll when in use, instead of being placed lengthwise, as in the older board.

This patent also shows a gripper, which is provided with points to take hold of the clothing to be washed, and to so firmly hold the clothing as to cause it to pass with it, as it is moved up and down over the spindle rollers.

An attempt is made to find the Todd board in this gripping device. To this attempt there are two answers:

First—That it is merely a device to take the place of the hand in washing;

Second—That if its projections are sharp enough or prominent enough to hold the clothing, and take the clothing with it as it is passed up and down on the board, then it is an improper construction for the wash-board itself, for it would tear the clothing in every attempt to use the gripper as a wash-board.

This board never went into use; was never manufuctured, and never had any existence outside of the Patent Office.

See Lash's letter, Exhibit E. A. K., p. 38.

Also the testimony quoted and the law cited page 32 of the argument.

The Lash board is constructed entirely of wood, with the exception of the spring arms of the gripper. It does not show any part of the old common board, or any improvement thereon.

It in no way affects the validity or limits the construction of the Todd patent. It does not contain the Todd construction, principle, or operation.

HYDE'S PATENT shows a reversible wash-board made by making holes through a thin plane board or sheet of metal, and forcing sections of small rubber cylinders through such holes, so that the contraction of the rubber by the holes will give each end the form of knobs or the round heads claimed for them by the patent.

This patent has no relation whatever to the old common board, or to the Todd improvements, added thereto.

It is radically different in construction, principle, and operation.

THE PARKER PATENT shows a spindle wash-board, made reversible, that is to be used on either side.

It differs from the ordinary spindle board only in the fact that the beads are arranged in line with each other, to permit a free passage of water through the board, instead of making the beads alternate with the grooves, as in the old forms.

The Parker board is made entirely of wood.

It has no relation whatever to the old fluted sheet metal board, used as a foundation for the Todd improvements.

THE HILL PATENT shows a sheet metal board, with circular knobs punched up from beneath, and in its completed condition it resembles the Bellus and Bowers board, made of round-topped tacks. These knobs are all raised from a plane surface, and if it was practical to make such a board, it would not anticipate or limit the Todd patent, for it cannot be used with the Todd improvements, either as a foundation for them, or as an improvement upon the

original fluted or corrugated board; it is a substitute for, instead of an amendment of, the old zinc board.

The Hill board does not contain the principle, construction, or operation of the Todd improvements.

THE HALL PATENT shows a wash-board, or a part of a washing machine, made up of curved corrugated wooden slats or staves, each stave having its corrugations inclined in opposite directions.

It also shows, for a rubber, grooved rollers with spiral grooves running in opposite directions at the ends, for the stated purpose of working the clothing toward the middle.

The Hall board, leaving out the holes or spaces between the staves, contains nothing more than the equivalent of the common board made in wood.

It does not have the principle, construction, or operation of the Todd improvements, nor can the Todd improvements be applied thereto, for the reason that it is a wooden and not a metal board; if made of sheet metal, this board would be ready for the Todd improvements.

THE HOMES PATENT apparently shows two wash-boards; the one in the tub being a common reversible spindle board; the other being formed of slats, and making a slight variation of the spindle board, for the stated purpose of preventing the water from passing through too freely.

The Homes board is a wooden one, and is of a variety which has no relation to the common board improved by Todd.

The Todd improvements cannot be applied to this board, and they differ from it in principle, construction and operation.

The showing of the older art gives us, in the main, the different ideas or theories upon which wash-boards are supposed to operate, and the constructions necessary to utilize such operations.

The first idea shown is that of Witsil, who proposes to make cups in the face of his board, to hold water to replace that squeezed out by the rubbing process.

Bellus and Bowers, Crihfield, Galusha and Safford, Hyde, and Hill propose to form or press up knobs from the under side of a plane sheet of metal, stating that such knobs are more effective than the corrugations of the old boards that Todd improved, and they are designed to take the place of the corrugations of the old board, instead of improving them. All of these boards, as well as the old common boards, hold the water to a certain extent, and the water passes off only at the lower end of the board. All of these boards avoid one difficulty of the old corrugated board: that is, being made of knobs formed on or raised from a plane surface, the rubbing up and down upon such knobbed surface does not tend to break the board across in one or more places, as it does in the old common board, and they are supposed to wear or injure the clothing less.

Lash, Parker, Hall, and Homes construct their spindle boards upon the theory that the water, when pressed out of the clothing, should be pressed through the board, and not be permitted to run down its face; and while some of them are made to prevent the passage from being too free, they all permit the water to run through them. Hall has, also, a provision for replacing it with strong suds.

It only requires an examination of the patents put in evidence by appellees to show that they have no relation

whatever to the Todd improvements, and Keech's is the only one that relates to the original board improved by Todd.

The Todd improvements can be added or applied to the Keech, and to the Galusha & Safford boards, also to the form shown by Hall, if made of sheet metal. They are not found in, and cannot be applied to, the Witsel, Bellus & Bowers, Crihfield, Lash, Hyde, Parker, Hill, or Homes boards.

Appellee's expert, Mr. Powers, p. 85, states: That as complete boards, the Galusha & Safford and the Lash model (Ex. 12) come the nearest to the Todd board. The Todd improvements can be added and the Galusha & Safford board, and the Lash is a roller spindle board to which the Todd improvements cannot by any possibility be applied, or be utilized in its original construction.

As to what is necessary to be found in books or patents, showing the older art, to defeat a patent; the following instruction given by Judge McLean, in *Parker* v. *Stiles*, 5 McLean, 44, covers the whole ground:

"It may not be improper to remark, however, that "where the defense that a mechanical contrivance, claim-"ing to be essentially similar to that covered by the plain-"tiff's claim, is set up, and the proof relied on is a de-"scription of such structure, contained in a printed publi-"cation, such description must have been sufficiently *full* "*and precise* to have enabled a mechanic to construct it, "and *must also have been, in all material respects, like* "*that covered by, or described, in the plaintiff's patent.*"

From this review of the older art it will be seen that there is in it nothing which requires such a limited construction of the Todd claims, as was given to them by the

court below. There is nothing shown which in any way anticipates or limits the Todd invention.

The court was clearly wrong in limiting the Todd improvements to a board having exact lines of corrugations or indentations, parallel with its sides and ends; or, specifically, "longitudinal" and "transverse."

As we understood the oral opinion of the court, which, unfortunately, was not reported, the patent was not limited by the showing of the older art, but by the words "longitudinal" and "transverse," which, as we have already seen, in their common use, are no more specific than lengthwise and crosswise.

Patentees are a meritorious class, and the courts will give them all of the aid and protection that the law allows.

Commissioner v. *Whitely*, 4 Wall. p. 532.
Grant v. *Raymond*, 6 Pet. 218.

Patents for inventions, under the fair application of the rule *ut res magis valeat quam pereat*, are, if practicable, to be so interpreted as to uphold, and not to destroy, the right of the inventor.

Turrill v. *Railroad Co.*, 1 Wall. 491.
Rubber Co. v. *Goodyear*, 9 Wall. p. 795.

The authorities are numerous that patents are to be construed liberally, and so as to conform to the actual invention, when the words of the patent do not prevent it. See:

Winans v. *Denmead*, 15 How. 330.
Seymour v. *Osborne*, 11 Wall. 516.

The case of *Winans* v. *Denmead* is particularly in point for the facts of this case.

The words of the Todd patent do not limit the invention claimed to specific lines. The older art does not limit the scope of the claims.

The gist of the Todd invention consists in cross grooving the ridges of the old board ; in cross ridging the channels thereof, and thereby improving the action of the board in use, and greatly increasing its durability.

These improvements follow the ridges and channels, whatever their original direction may be.

Infringement.

The question of infringement is practically settled by the construction given to the Todd claims, for appellant applies the identical Todd improvements to the same old rigid zinc board which Todd took for his foundation.

The evidence and the Keech patent show that the old zinc board was not always made on transverse lines; that it was common to vary them by making them nearly or quite as oblique as the appellee makes them, and to zig-zag them, as shown by the Keech patent.

What did Todd invent? The answer to this question is, that Todd invented a means for strengthening the old board by stiffening its ridges with cross indentations, which made them rigid, and prevented them from working, so as to crack in use.

He invented a method for preventing the metal of the channels or grooves from working upon itself when in use, so as to crack or break by raising ridges across them, as shown in his patent.

These improvements not only improve the strength and durability of the metal part of the board, but they improve its quality as a completed wash-board. These cross indentations give to the old corrugated board the action of the knob board or the beads of the spindle board, without their injurious smoothness, while the knobs or beads shown in the patents can not be combined with the flutings or ridges of the common board.

Appellee makes its board by adding the identical Todd improvements to a common wash-board, which had its flutings in a sloping direction, instead of being at an exact right angle, but it strengthens the ribs the same way that Todd does; it strengthens the channels the same way that Todd does; it reduces the long channels of the common board to short ones, the same way that Todd does; it gives the fluted or ribbed board the same knob action by the same means that Todd uses, and the only claim of difference is, that its board gives the water a slightly freer downflow by the inclined direction of the original and the new Todd grooves. If there is anything in this, it is the merest matter of addition; and it seems to us that the court below erred greatly in permitting the appellee to escape on such a point, and particularly in reference to the second claim.

"Where form and substance are inseparable, it is "enough to look at the form only. Where they are sep- "arable; where the whole substance of the invention "may be copied in a different form, it is the duty of "courts and juries to look through the form for the sub- "stance of the invention—for that which entitled the "inventor to his patent, and which the patent was de- "signed to secure; where that is found, there is an "infringement; and it is not a defense, that it is embodied

"in a form not described, and in terms claimed by the "patentee."

Winans v. *Denmead*, 15 How. p. 343.

It will be seen from the exhibited art, that there are a great variety of opinions as to the utility of speedily disposing of the water pressed out from the clothing.

The spindle boards are constructed on the theory of letting the water through immediately or at the point of discharge; the knobbed boards, such as Crihfield, Galusha & Safford, Bellus & Bowers, and others, have all of their channels running down for the free escape of water, but preventing its immediate escape, while Witsil provides cups for retaining the water on the face of the board.

The old zinc board, by its corrugations, detained the water, to a certain extent, and the fact that this board outlived all of its competitors would indicate that its construction was, in principle, more nearly correct than the others.

Todd's improvement gave the water a freer escape than it had before. It gave the clothing a spreading and contracting movement under the hand, like the knobbed boards, which it did not have before, but to a less extent; and he therefore, by his invention, combined with the old parts of the board all of the advantages of the other boards, and made the first board which, in the history of the art, to any extent superseded or competed with the common board.

Appellee's board has all of these advantages; it has all of Todd's improvements; it has them for the same purpose, and they produce in its board the same improved results that they did in his own board.

The evidence shows that the Union Manufacturing Company, one of the appellants, made boards under the Todd patent, which were identical with the appellee's boards, that is, the lines were sloping, like those of a rasp or file, as early as 1872, and every year thereafter, and paid royalty on them the same as for the other form. This fact is not, of course, conclusive as to whether the diagonal form is covered by the Todd patent, but it shows the judgment of skilled manufacturers before any controversy arose, and to this extent it is important.

THE HULL PATENT is granted for grooves in a plane sheet of metal, which are so far apart as not to make ridges, and it was evidently granted through inadvertence on the part of the Patent Office, if it covers appellee's board, as its board is so manifestly the Todd board, in a slightly varied form, and a form in which the Todd board had been on the market for years prior to the date of the Hull patent. The court below, therefore, erred in attempting to draw such a line between the Todd and Hull patents as would leave both valid, for appellee never used the Hull patent, but has followed Todd literally, with only a variation in the direction of the lines.

A junior patent in no way affects the validity or scope of an older one.

Blanchard v. *Putnam*, 8 Wall. 425.

We are advised by Mr. George H. Christy, of this bar, and who tried the cause for complainants founded on the Todd patents, that a suit was tried in the Western District of Pennsylvania, in 1880, before Mr. Justice Strong and McKruman, C. J., when the patent was sustained, and wash-boards similar to appellee's board held to infringe, and that in that case, as in this, there was no opinion filed.

ARGUMENT.

This suit is brought for the infringement of a patent covering improvements for one of the most common of household articles—a wash-board.

The fact that such a patent is brought before this court, calls attention to the underlying principle which distinguishes modern from ancient civilization, which is, the perfect union of science with the mechanic arts or trades.

Plutarch, in his life of Marcellus, tells us that Plato inveighed with great indignation against Archytas and Endoxus, for debasing the excellence of geometry by using mechanical solutions, and obliging it to make use of matter, which belonged to the servile trades.

Science does not to-day disdain the alliance, and their recent happy accord explains the wonderful advance of modern material progress.

The fathers were of the opinion that improvements in the arts should be encouraged and protected, and for these purposes they took them out from under the local strifes and illiberal prejudices of states, and away from the unreasoning populace, and gave the care of fostering them to the Nation.

For this reason we are before your Honors, and for the reasons that this stupid and ancient prejudice has largely disappeared, we are happy in presenting for your judicial consideration a patent for improvements on a common article which is to be found in every household, knowing that it will receive the same attention that it would were its subject matter related to steam or electricity.

The board improved by Todd, is one which was approved in its original construction by the test of time, to wit: the transversely ribbed zinc board.

The improvements for this old board, as claimed, are divided into three points or parts, and the claims are as follows:

"1. A sheet-metal wash-board, having a series of "raised projections, B, each bounded by longitudinal and "transverse grooves or depressions, substantially as set "forth.

"2. In a sheet-metal wash-board the projections B, "each bounded by grooves, or depressions, in combina- "tion with raised projections C, in the bottoms of the "interlying grooves, substantially as set forth.

"3. As a new article of manufacture, a sheet-metal "wash-board, having a rubbing-face both longitudinally "and transversely ribbed or corrugated, substantially as "set forth."

The first claim refers particularly to the rubbing-face; the dividing of its transverse ridges into short sections or projections by indenting across them to produce small grooves or depressions. These cross-grooves produce two beneficial or useful results, as appears from the testimony:

First—They improve the action of the face of the board in use.

Second—They stiffen the ridges so that the sheet-metal face is less liable to yield or crack in use, or under pressure, and cracks, when started, are less liable to follow the line of crimping.

The second claim is for the stiffening projections across the channels or original grooves of the sheet-metal or zinc face, in combination with the raised projections or

indented ridges which constitute the washing-face, and thereby complete the stiffening of the metal sheet.

These two claims apply only to the zinc or sheet-metal portion of the board.

The third claim is for the completed article, that is, the zinc or sheet-metal portion having the raised projections B, or cross-cut ridges, with the lower projections set in its frame-work ready for use. Or, as it is termed by the witnesses, the completed double-crimped board, embracing the features of first and second claims, combined together and with the frame.

The invention is not difficult to understand; its points of utility are apparent, and they are plainly brought out by the evidence.

The appellee did not seriously controvert the utility of the improvements, but rested its defense upon two grounds: 1st, want of novelty; 2nd, non-infringement. The first was decided in favor of the appellants, and the patent was adjudged to be valid. The second was decided in favor of the appellee, and it is upon this second point that the appeal is taken; but as the question of novelty may be raised by appellee, it is here considered.

Novelty.

A long list of patents by which the invention is supposed to be anticipated, is set up in the answer; but of these, the patents to Keech, Exhibit 5, Bellus & Bowers, Exhibit 6; Crihfield, Exhibit 7; Galusha & Safford, Exhibit 9; and Lash, Exhibit 11, are the only ones regularly exhibited. Witsil's patent, Ex-

hibit 3, is not set up in the answer, and it has no further use than to illustrate the older art.

The others were exhibited without copies of any kind. Their introduction in evidence, p. 103, is as follows:

"Also, the following letters patent of the United "States in wash-boards, *from printed volumes*, to wit:"

Then follows the list. There are no printed volumes named in the answer, and, in their introduction, no name, volume, title or page is given. Out of this list specifications were admitted by order of the court as follows, to wit: Hyde, Parker, Hill, Hall and Homes. Appellee examined no witnesses in reference to them, and the only testimony in reference to them is the following, taken by appellants.

(P. 46.) Q. 9.—"Have you examined, and are you "familiar with the devices shown and described in the "following patents exhibited by defendant, to wit: Patent "No. 14,111, January 15th, 1856, to *Ira S. Parker;* "* * * patent 32,994, August 6th, "1861, to *Warren Hill;* * * * "patent 11,426, August 1st, 1854, to *Joseph Hyde;* "* * * patent 47,206, April 11th, 1865, "to *Nelson Homes;* * * * patent "39,343, July 28th, 1863, to *A. Hall?* If so, please "state whether or not you find in any or either of said "patents, wash-boards shown or described, which are, in "your opinion, the same, or substantially the same, as "the improvements described and claimed in complain-"ants' patent.

A.—"I have carefully examined all of the exhibits "referred to question, and do not find in any one of them "the improvements, or either of them, specified in the

"three claims of patent Exhibit "A." None of the ex-
"hibits referred to in the question have any substantial
"resemblance to the doubly-corrugated sheet-metal
"wash-board specified in Exhibit "A," and, in fact,
"not one of them shows even a sheet-metal wash-
"board. Most of them are wooden roller surfaces. One
"is an India-rubber wash-board, having elevated ribs,
"crossed by ribs of the same height; and another
"is apparently a cast-iron washing plate, adapted to form
"both front and back, with a front having hemispherical
"knuckles or projections thereon, apparently formed on
"the casting or rigid plate."

This is all of the testimony that there is in the case in reference to these patents.

In reference to the Witsil patent, Milward, p. 43, testifies as follows:

"Defendant's Exhibit 3, Witsil patent, I am clearly
"of the opinion that said Exhibit 3 does not embrace the
"several improvements specified respectively in the first,
"second, and third claims of the patent Exhibit "A," for the
"reasons that it is not, in the first place, a sheet metal
"wash-board; in the second place, that it has no corru-
"gations or folds intersecting each other, as the corruga-
"tions or folds of Exhibit "A" are required to do, and it is
"not adapted to perform the same office in the same way
"as the sheet metal wash-board shown and described in
"Exhibit "A." It is simply a wooden wash-board with
"cups turned in its rubbing face, each surrounded by an-
"nular grooves."

Powers, p. 79, substantially agrees with Milward.

Milward, p. 44, testifies in relation to the Keech patent as follows:

"As to the device shown in the Keech patent, de-
"fendant's Exhibit 5, I would state that it is simply a
"wash-board with a rubbing face formed by a corrugated
"zinc plate with the corrugations all running one way,
"crosswise, but in a zigzag or rail fence style. These cor-
"rugations are not crossed or intersected by corrugations
"or crimps running transversely thereto, which is re-
"quired to be the case in the formation of the wash-board
"shown in Exhibit "A," and for this reason I am of the
"opinion that defendant's Exhibit No. 5 does not em-
"brace either of the improvements specified in the first,
"second, and third claims of patent Exhibit "A."

On p. 44 he testifies in reference to Bellus & Bowers as follows:

"With reference to the Bellus & Bowers patent, Ex-
"hibit 5, I find that its rubbing face is composed of a sheet of
"metal in which there are no corrugations or crimps in either
"direction, but the plate is perforated at intervals, and
"spherical-headed nails are driven in, so that the face is
"composed of a flat plate of metal, with semi-spherical
"prominences at intervals over its face. Owing to the
"fact that this is not a wash-board having a rubbing face
"formed by sheet metal, fluted, crimped, or corrugated
"in two directions, as the patent Exhibit "A" requires, it
"cannot be said that this Exhibit number 6 embraces
"either improvement specified in the first, second, or
"third claims of patent Exhibit "A."

The question as to whether the appellants' patent has been anticipated by prior patents is narrowed down by the record to three patents, appellee's Exhibits 7, 9, and 11; and of these, the appellee's principal expert, Powers, p. 81, q. 49, states unreservedly that No. 7, Crihfield, does not contain appellants' invention. On

p. 81, q. 51, he admits that the Galusha & Safford patent shows another kind of a wash-board, and that "they *lack* "*the longitudinal and transverse lines of depressions, re-* "*cited in said patent.*"

In reference to Exhibit 11, Lash, there is no pretense by any one that the board itself has any resemblance to the appellants' board. Powers, p. 82, admits that, being wholly composed of wooden rollers, it belongs to another class of wash-boards, but thinks that he finds the invention in a little attachment designed to take the place of the hands in rubbing, and which has its under face so *roughened as to prevent any movement of the cloth across it.* But upon consideration of the whole of the older art, he concludes, on p. 85, q. 72, as follows:

"As a wash-board complete, the Galusha & Safford "defendants' Exhibit 10 ('the model') comes the nearest "to showing a series of elevations and depressions, as "stated in the complainants' patent." This is the same patent that he, on p. 81, refers to as lacking the longitudinal and transverse lines of the Todd patent.

In view of the conclusion of the whole matter by Mr. Powers, we are justified in assuming that the sole ground of defense on the novelty issue is narrowed down to the Galusha & Safford patent, Exhibit 9, illustrated by the model Exhibit 10, and will, therefore, consider this first, and the three remaining exhibits in the order of the importance attached to them by the appellee, and not by their numerical order.

Galusha & Safford's Patent.

The testimony taken by appellants on this patent is as follows: Milward, p. 45:

"With reference, then, to the device shown in the "Galusha & Safford patent, defendant's Exhibit 9, and also "shown in the certified model, defendant's Exhibit 10, I "find that there is a degree of indefiniteness about the "description which renders it difficult to understand. "The specification states that 'sheet zinc will prob- "'ably be used for the part B, at least this would be "'the most desirable material.' It is difficult for me to "understand how sheet zinc could be forced, by any of the "well known processes of shaping metals, into the form "shown by the drawing and model, without the breaking "of the zinc at every depression, as it is a metal having "but little ductility; and I find that in the model, Exhibit "No. 10, zinc has not been used for its formation, but "soft brass, afterwards tinned. But, irrespective of this "apparent impracticability of formation in the way the "patent describes, I find that the Exhibits 9 and 10 do "not illustrate a wash-board whose rubbing face is formed "of sheet metal crimped in two directions, as the patent "Exhibit "A" requires, but illustrates a plate of metal "designed to be punched up into a number of hills or "prominences with dies. I do not see any resemblance, "in the principle of construction, between a plate formed "in this way, with a succession of prominences, and the "plate shown in the patent Exhibit "A," formed by crimp- "ing or corrugating in intersecting lines, as shown in said "patent; and I do not think, therefore, that these "Exhibits 9 and 10 embrace the improvements specified

" in the first, second and third claims of Exhibit "A," but " am clearly of the opinion that they do not.

" The projections described in complainants' patent " are formed by lines running in two directions, so as to " cross or intersect the double series of lines being formed " by grooves or depressions, while the plates shown in " Exhibits 9 and 10 have prominences or protuberances " bounded by the original base of the plate, so as to form " valleys extending completely around each protuber- " ance."

Herzig, an experienced manufacturer of wash-boards, referring to the Galusha and Safford model, testifies (page 59) as follows :

" This model is made of sheet brass, and the projec- " tions appear to have been worked out by hand, one at a " time. This process would not be practical. I don't " know of any other process by which this board could " be made."

Bischoff (page 63), also an experienced workman, says that form could not be practically made, either by stamping or crimping, because the points pass each other, and it is more apt to wrinkle it up and break it out. I don't think a machine could be made to make a board like that.

Hanlin (page 65), another experienced workman, referring to Galusha and Safford's plan, says :

" I don't think it could be made practically for the " market, because the board would have to be stamped, " it could not be crimped, and the same reason would apply " to it that I have named in the Crihfield, only I think " this would be worse than the Crihfield on account of " the points passing each other so closely." * * *

" The points being so close together, the strain of two of " the projections would naturally break the metal."

Mrs. Janney (page 69), referring to the quality of the Galusha & Safford board, says:

" I think that (defendant's Exhibit '10') would make a " poor washer. I would like the common board the best."

Mrs. Andrews (page 71) says:

" I should think it would be of very little use * " * * Owing to the rounded form of " the knobs. I don't think the size of the knobs would " make much difference. It seems like a smooth surface under the hand."

Of the appellee's witnesses, Upham (page 96) is against the practicability of the Galusha & Safford board.

Tracy (pages 99 and 100) is of the same opinion as to the continuous channel.

Clark (page 102, q. 17,) testifies as follows:

" The first claim of complainants' patent is read to " witness, and he is asked if he finds anything in Exhibit " '10', answering to the conditions of said claim? A.— " Those are not the terms I should use in describing this " board," i. e., the Galusha & Safford board.

Powers (page 81) says this board " lacks the longitudinal and transverse lines of depression recited in said patent," i. e., the Todd patent.

The Galusha & Safford exhibits do not show or contain any transverse lines or ridges, or any longitudinal grooves. They do not contain or show any raised projections, bounded by longitudinal and transverse grooves, so as to form angles.

The washing value of the Todd board consists of the large number of angular projections of which the rubbing face is formed. The few projections shown are rounded

and large, instead of being small and angular, so that the efficiency of the board for the use designed is nearly or quite destroyed, instead of being improved.

Figs. 2 and 3 show that the metal part must be of stiff and heavy metal, as it has no backing board to assist in keeping it up or to support it. The little strip of frame in the middle is so far out of contact with the metal that it cannot afford any support. The whole thing seems to be an attempt to work out in metal a wooden spindle board, like that shown in the Hatch patent.

The Crihfield Patent.

The Crihfield board does not seem to be of much importance, for it is not seriously contended that it is an anticipation of the appellants' patent, but its supposed use is to show that the appellee's board is nearer like this than it is like appellants', the fallacy of which will appear when we come to consider that question further on. Considerable testimony has been taken in reference to this board, in order to show that it cannot be practically made as patented; that it is almost worthless when made in the best form in which it can be manufactured, and that it belongs to a different order or class of wash-boards.

Milward (page 44) testifies as follows:

"The plate shown in Exhibits numbers 7 and 8 must "be made by submitting the plate to the action of a pair "of dies, the feeding of the plate being such that rows of "prominences must be made by successive blows, to les-"sen the danger of breaking the metal. Owing to the "fact that the wash-board shown by these Exhibits 7 and "8 is not one whose face is formed by intersecting crimps

"or corrugations, I am of the opinion, clearly, that it "does not embrace the improvements specified in the "first, second and third claims of patent Exhibit 'A.'"

Lyttle (page 54) testifies concerning this Crihfield board as follows:

C. Q. 1.—"It is manufactured by the Udell Ladder "and Wooden Ware Company, of Indianapolis, Indiana. "It is made under that patent, but not in accordance with "the patent. * * *. It is not a crimped, but "a pressed board, being irregular lumps, raised up by "pressure from a plane surface. * * * I know "of no other company making them at the present time; "but our company manufactured them for about a year "previous to the Udell Company's making them, but "*finding them unsatisfactory to the trade, we abandoned* "*them.*"

Janney (pages 57, 58) testifies as follows:

Q. 6.—"Did your company, at any time, attempt the "manufacture of wash-boards under the Crihfield patent, "defendant's Exhibit 7? If so, what success did it "have in the manufacture and in the sale of such boards?

A.—"We did in the year 1871, I think, commence "to make wash-boards under said patent, but found them "a difficult board to make, and very unsatisfactory to "handle in the market. The reason they were difficult to "make was, the zinc in forming had to be pressed or "stamped, which was a slow process, and spoiled a great "many sheets of zinc by crushing or bursting the zinc in "making the projections. It was not satisfactory to the "trade because it did not give satisfaction to the consum-"ers. I think the cases were rare when we sold two lots "to the same parties; there were plenty of cases where "purchasers wanted to return what they had bought, and

" take single crimped or common boards in exchange.
" *We found it a complete failure.*

Q. 7.—" State, if you know, why your company " commenced the manufacture of boards under that " patent?

A.—" The reason was that we wanted to get hold of " a new board that we could sell at a profit without so " much competition as there was in the common boards; " some of the firm thought that we could run it success- " fully against the Todd patent.

Q. 8.—" State, if you know, whether said company " abandoned the making of boards under said patent; if " so, why?

A.—" They did, because they found it was not a suc- " cessful competitor with the Todd board, and not a satis- " factory board to make and sell.

Q. 9.—" How did it compare, for service, with the " common single crimped board?"

A.—" I think it was not as good as the common " board."

Herzig, who has made wash-boards of various kinds for the last seven years, p. 59, says:

" I was engaged in the manufacture of wash-boards, " made after the plan of the model now shown in defend- " ant's Exhibit 8. I can't now state how long I worked " on that board, as it was some time ago. The difficulty " mentioned was the breaking of the bulges in stamping " the metal. * * *

" The Crihfield board was made by a stamping " machine, and the other was made by rollers, on a crimp- " ing machine.

Q. 6.—" Are the stamping and the crimping pro-
" cesses considered in the arts the same, or as different
" processes?

A.—" Different processes.

Q. 7.—" Please say whether or not the board in the
" Exhibit 8 can be made by the crimping process, and
" whether or not the Todd board can be made by the
" stamping process? In answering please give your
" reasons.

A.—" I don't think this board, Exhibit 8, can be
" made by the crimping process, for the reason that the
" bulges would break in the process. They must have
" tried the roller before they got the stamping machine,
" because that is so much easier, and would turn out a
" dozen where the stamping machine would turn out one.
" I don't think it would be practicable to make the Todd
" board by stamping, because the process would not be
" rapid enough; couldn't turn them out in any quantity;
" besides I don't think it can be done."

Hanlin, who has had a similar experience, and who has worked on the boards, on pp. 64 and 65, says:

" The difficulty in making the Crihfield boards was
" that the zinc had to be *stamped* instead of *crimped*, and
" the process was so severe on the metal that it broke it
" through both at the sides and at the points of the pro-
" jections so made; and, besides, the operation was a very
" slow one.

" The stamp was somewhat modified from this model;
" the points were prolonged and run together. * * *

" It would be impracticable to make boards accord-
" ing to this model, even with a stamp, because the strain
" is too severe, and breaks it out; the modified form is,

" of course, the best of the two for manufacturing pur-
" poses. * * *

" The last ones I run, I run on an order of twelve
" dozen, and had to make sixteen dozen zincs to get twelve
" dozen of boards, because we lost *four dozen* by damage
" in stamping. * * *

" The Todd board could not be stamped, because it
" is a double process; if you undertook to stamp it, it
" would crush the crimp out, and be too severe on the
" zincs. To crimp the Crihfield board, I don't think a ma-
" chine could be made; and, if a machine could be made,
" it would cut all, or nearly all, of the zinc or metal, as
" the strain would be too severe.

Q. 9.—" Could the Todd board be stamped by a
" single process? A.—It could not, because it would cut
" the zinc all to pieces. There is no doubt about it; my
" experience on the Grihfield board is conclusive evidence
" to me on that point."

Mrs. Janney, p. 68, in reference to the washing qualities of the Crihfield board, testifies as follows:

Q. 8.—" How did the Diamond or Crihfield board
" compare with the Globe board in washing? A.—No
" comparison; the Globe board is decidedly the best.

Q. 9.—" How did the Diamond or Crihfield board
" compare with the old common (Exhibit 2) board in
" washing? A.—I think I liked the common board (Ex-
" hibit 2) better than I did the Diamond. I did not like
" the Diamond at all."

Mrs. Janney is the only witness introduced who has tried to use the modified Crihfield, and as she tried it for a test before there was any controversy about the Todd board, her testimony seems quite conclusive, that

this board is not equal to the common or single crimped board.

The Crihfield board is simply one having a plane surface, with diamond shaped projections punched up from below. It does not contain the Todd invention, nor does it have even the appearance of the appellee's board.

Appellee's expert, Powers, p. 81, admits that the Crihfield is not an anticipation of appellants' patent. He says: "The indentations are not longitudinal nor "transverse, as is referred to in the first claim to the com- "plainants' patent." If it does not contain the invention claimed first, it cannot contain those claimed second and third, if all are restricted to exactly parallel and exactly transverse.

The Lash Patent.

There is no pretense that the Lash *board* contains the appellants' invention, or that it belongs to the same class of wash-boards, for it has no metal face, nor even fixed face. It is composed of wooden rollers, having alternately increased and diminished diameters, arranged across the frame. Lash says: "In this frame, I arrange "a series of rollers, B, so that they may freely turn upon "their journals by the act of moving the clothes over "them under pressure." This movement prevents any rubbing action from taking place, so that its only principle of operation is that of shifting pressure, instead of friction.

On the top of this board there is placed a hand board, or gripper, to give the required pressure on the rollers, and in order to prevent this gripper from riding

on the enlarged portions of the rollers, it is grooved out, so as to act between them. There is no movement of the clothes under or across this device.

Milward, pp. 45 and 46, testifies, concerning this Lash board, as follows :

"I find nothing in defendant's Exhibits 11 and 12 "which is substantially the same as either of the improve- "ments specified in the first, second and third claims of "complainants' patent Exhibit 'A.' These two exhibits "show a wash-board having a rubbing face, that is, a face "on which the clothes rest and move, composed of a "series of rollers turned into beads and grooves, and lying "close together, so that the beads of one roller fit into the "grooves of the next. This is the wash-board, and in "place of allowing the operator to grasp the clothes, the "inventor provides a gripper, or holder, above the wash- "board, by which the clothes are held and moved. The "under side of this holder, which is a block of wood, is "grooved in the direction of motion, and it has smaller "grooves crossing these ; and the patent states that these "latter grooves, marked *e*, are for carrying or moving the "clothes along over the rolls, and preventing them from "lying in one place, or for holding them against the "rollers. There is no part of this patent which either "shows or describes the wash-board whose rubbing face "is composed of sheet-metal fluted, crimped or corru- "gated in intersecting lines ; and for this reason, I am of "the opinion that these Exhibits 11 and 12 do not em- "brace the improvements specified in the patent Exhibit "'A,' and summed up in the three claims thereof. And "as to the second part of the question, I am of the "opinion that the rubber board, 'C,' of Exhibit 11, would "not suggest to a constructor the doubly-corrugated

"wash-board shown in Exhibit 'A,' any more than the "looking at the surface of an ordinary cast-iron waffle-"iron would suggest the construction shown in Exhibit "'A.'"

Herzig, p. 61, referring to the gripper, testifies as follows:

"I don't see anything in it that would give an idea to "make a wash-board like Todd's, or any metal wash-"board. * * *

"It takes the place of the hands to hold the clothes. "It has no other office. There is no movement of the "cloth under the rubber holder."

Bischoff, p. 64, testifies as follows:

Q. 17—"Please look at the Lash model, defendant's "Exhibit 12, now shown you, and say what, if anything, "you find in that model that would suggest the Todd "board, or instruct a workman how to make the Todd "boards.

A.—"No, sir; I don't see any; I don't see where "there could be any at all."

Hanlin, pp. 66 and 67, referring to the Lash model, testifies as follows:

"I don't find anything here that would suggest the "Todd board to me. I have had considerable experience "in making wash-boards; I have been at the business "nearly seven (7) years now. I have already said that I "would not make the Todd board by looking at this "model. * * *

"They don't look alike at all, to my eye. There is a "projection in the grooves in the Todd board which is not "in the Lash model. The grooves in the Lash model, of "rubber board, run in contrary direction to those in the "Todd board."

That the Lash board is a worthless one is apparent from inspection, and if any evidence was wanted of its worthless character, it is furnished by Lash himself in Exhibit A. E. K. 6 (page 38), where he states that he never made a board under this patent, or like it.

The patenting of a worthless device or inoperative machine does not save it from the category of abandoned experiments, and such attempts, even though patented, are not in the way of a subsequent inventor who takes up the machine and perfects it.

Whitely v. *Sawyer*, 7 Wallace, 685.

Referring to two patents older than the one sued on, this court, in *Whitely* v. *Kirby*, 11 Wall. 679, makes the following statement:

"The first, Nelson Platt's, of La Salle County, Illi-
"nois, June 12, 1849; the second, Alfred Churchill's,
"Kane County, same State, March 3, 1841. *There is no*
"*proof in the record in respect to these patents.* Whether
"any machine was ever constructed under either of them,
"or went into practical use if constructed, or whether
"each were but an imperfect and abandoned experiment,
"are matters apparently regarded by the counsel who
"introduced them as of no great importance. Nothing
"appears to be known in respect to them except that
"they were found among the records of the Patent Office,
"and have relation to the subject of grain harvesters."

This is true as to every patent introduced by appellees except the Lash, which, as the record shows, was never used, even to the extent of one full-sized board.

This was reaffirmed in *Brown* v. *Guild, administrator, et al.*, 23 Wallace, 181, where this court held that the corn planter patented by Todd, who built six machines,

was abandoned. The language of the court, on p. 208, is as follows:

" Hale was the only witness examined on the subject " of this machine. He says he helped Todd make six of " them, and that they were used, and worked satisfacto- " rily, in or about 1844. This being all that is heard of " this machine in the cause, it is probable that its use was " discontinued, and that it shared the fate of a thousand " other devices which approach the point of final perfec- " tion and success, but do not reach it. The differences " between this machine and Brown's, are just those differ- " ences which rendered the latter a success, and a valuable " acquisition to the the agriculture of the country."

Hull, p. 87, says:

" If the variation makes a new device, I consider it a patentable article."

Tested by Hull's rule, the Todd patent stands strong, for it is apparent that not one of these patent exhibits contains even a germ, or rudimentary element, from which his improvements could grow, and that it is a new device in reference to each and all of them.

It usually happens in patent suits that a state of the art is shown approaching quite closely to the patented improvements ; that some one or more almost reached the desired point, and that their improvements were of some value, and had some use, until the true genius came along and added those finishing touches that made it a success, and drove all other attempts out of the market and out of use. In this case we do not find such surroundings. The patent stands unusually clear in the art, for, so far as it appears at all, it appears that not one of the attempts made to improve the wash-board ever went into use ; that the common wash-board, with its slight modifications,

held its original superiority against all comers until the Todd board appeared; and that the late attempts to change the Crihfield into a Todd, or into a common board, have been failures.

Market.

Extensive use, of itself, is not conclusive, but it has weight on the questions of utility and invention in filling what before was vacant space.

The condition of the market in 1872, before the success of the Todd board was assured, is stated by Mr. Janney, p. 57, as follows:

Q. 4.—"At that time (1872) what kinds or varieties "of wash-boards did you find in the market?

A.—"There were several brands of common or "single-crimped boards, but two other patent boards of "any importance, that I know of: first, the 'Union Groove,' "made by the Union Manufacturing Company; the patent "improvement on that board was a *grooved back*, grooves "which were intended to fit the corrugations and support "them; it was a single-crimped board. The 'Eagle,' "which was a single-crimped board, the patent improve-"ment consisting in the raised edges, to get the edges into "a single saw kerf, and to turn the water back into the "centre of the board; another single-crimped improve-"ment was made by cutting the edges of the zinc into the "form of saw teeth, for the purpose of pressing the zinc "into the sides or legs of the wash-board, so as to do away "with the necessity of cutting a place to receive the same. "These were the only ones that had any prominence at "that time. * * *

" The first cross-crimped board I ever recollect see-
"ing was in Alleghany City, Pa., about the year 1871, in
"the summer or fall. It was made by Westly Todd, by
" himself, under his own patent. I was much impressed
" with the value of the board when I first saw it, and took
" pains to find out all about it. I inquired where I could
" find Mr. Todd, went to see him, and tried to arrange to
" make the board on royalty, but found he had mortgaged
" it, and that no arrangement could be made that was sat-
" isfactory. This was the first and only cross-crimped
" board I found on the market."

Efforts in Introducing.

When a valuable improvement is made in any art, the labor commences with the completion of the invention, for the old has to be crowded out, or the new must wait its turn for the recognition of its merits, and in either event the progress of the new is slow until its value is recognized by the public, and such recognition always requires the tests of both use and time.

In this case the record shows the efforts made and the growth of the business as the value of the improvements became known, under the use and time tests.

Kitzmiller, p. 54, testifies as follows:

" As a firm we did manufacture wash-boards under
" the Todd patent, complainants' Exhibit 'A.' We com-
" menced the manufacture of said boards on or about the
" 1st day of August, 1871; and used every effort to intro-
" duce them to the trade. We ceased manufacturing the
" said wash-boards on or about the 1st day of August,
" 1872, and during the time afore-mentioned, we made
" thirteen hundred and eighty-four (1,384) dozens. By

" the firm I mean P. Duff & Sons, complainants in this " suit."

Janney, p. 58, states as follows:

" I was well satisfied, in my own mind, before we got " the Todd board to make, that it was a superior board, " and when I commenced the sale of them on the road I "tried to induce every customer to take a few of them and " give them a fair trial. They gave general satisfaction " and the trade in them increased rapidly. I visited most " of the cities in Ohio, Michigan, Indiana, Illinois, Mis- " souri, Maryland, District of Columbia, Pennsylvania " and Western New York, Kentucky, Iowa, Wisconsin " and Delaware."

Lyttle, p. 53, for the Union Manufacturing Co., testifies as follows:

" We have had traveling agents out nearly all the " time since we commenced the manufacture of this " board, who have solicited orders as far west as Omaha " and Kansas City, and as far east as Boston, and south " to Louisville. We also exhibited the board at the Cen- " tennial Exhibition, and from that exhibition made " several foreign shipments. The company is now filling " an order from Dublin, Ireland, for 120 dozens of these " boards. Our sales have been constantly increasing from " the time we commenced manufacturing the board until " the present time."

Dakin, p. 56, shows the growth of the business, notwithstanding " hard times," to have been as follows:

" The year 1872, from August 17th to December " 31st, inclusive, there were sold twenty thousand two " hundred and forty-one (20,241).

" For the full year 1873 there were sold 61,879.

" For the year 1874, 241,404.

" For the year 1875, 439,490.

" For the year 1876, 515,200.

" For the first quarter of this year, there were sold " 114,534, being an increase over the first quarter of 1876 " 16,618 boards. The first quarter is always the poorest " of any quarter of the year for sales.

Q. 5.—" When did the company first meet with com- " petition in the market in double crimped wash-boards?

A.—" To the best of my knowledge, some time in " February, 1876; this was about the time our customers " commenced complaining about other boards, and ask- " ing for reduced prices, on account of competitors offer- " ing other boards at less price."

It has happened to the appellants, as usually happens to those who make a success of a patented improvement or invention, that as soon as a market has been made, and the commercial success of the undertaking assured, infringers begin to creep in, to take advantage of the time, labor, expense, and ingenuity bestowed; and these appellees have exercised the business prudence of waiting till all possible contingencies of failure have passed; till there are no more experiments to be made to determine the best form, the cheapest construction, and the best material; till there is no risk of capital, no market to be made, and no useless or defective machinery to be rebuilt or abandoned. When the first infringement was discovered, appellants had made and sold over 800,000 improved wash-boards.

See *Rubber Co.* v. *Goodyear*, 9 Wall. p. 793.

Lyttle, p. 53, gives the dates of the infringements, as follows: " I first met with competition in February, " A. D. 1876, on a Western trip. The next time I met " with it was in April, 1876, on my next trip. This com-

" petition was from a board of similar appearance to our " patented board, which they were selling at a less price. " The first board that I met was manufactured at Muscatine, Iowa; at first they were not branded at all, but " afterward they were branded 'The World,' which I supposed to be in imitation of our own, which were " branded 'Globe.' It was manufactured by Brent " Brothers. The next board I met is known in the " market as the 'Sterling board.' The World board " they soon stopped making, the reason I suppose, of an " injunction against J. F. and J. E. White, wooden-ware " dealers in Chicago, Ill. The Sterling board is still " manufactured, and I have no doubt they are injuring " our sales largely. The Sterling board is being *offered* " *in the market as an improvement on our board*, and at a " less price. Within the last year some three or four " others have come to our knowledge as manufacturing a " board similar in appearance to ours. There is one manufactured, in a small way, at Springfield, Ill.; one in " Cleveland, Ohio, and two in Norwalk, Ohio."

Value of Todd's Improvements.

The value of the patented improvements may be classed under two heads: 1st—Those affecting the durability of the board; and, 2d—The improvement of its washing qualities, with attending results.

As to the first—durability—the testimony is as follows: Kitzmiller, p. 55:

Int. 4.—" What, or about what, is the average life of " wash-boards, like your Exhibits 1, 2, 3?

A.—" That depends somewhat on the amount of use " and the care taken of the board. Some only last a few

" months, others a year, while some may, with great care, " last even two years ; but I should judge the average life " of a plain crimped board to be about one year."

After introducing the old common boards, Exhibits E. A. K. 1, 2, 3, he continues: " I have " procured these boards for the purpose of showing how " and where such boards give way in use, and to show the " effect cross crimping has in giving life to the board. " These boards show that by use they break at the angles " above and below, or at the top or bottom of each ridge " or rib."

Int. 5.—" So far as your knowledge extends in " regard to the boards manufactured by your firm in " 1871, what, or about what, is the average life of boards " made under the Todd patent, or cross-crimped boards?

A.—" As far as I know, they are all still in use. I " have never yet seen one of them worn out or unfit for " use. The Exhibit 4 I have produced, is the nearest " worn out I have been able to find, and it was injured by " an accident in moving, and is still a good wash-board.

" Exhibit 'E. A. K.' 4, is one of the wash-boards " Messrs. P. Duff & Sons, complainants, manufactured " under the Todd patent, in the year 1871. I have pro- " cured this for the purpose of showing the wearing " qualities of these wash-boards, it having been in con- " stant use from the time it was made, in 1871, up to " April 16, 1877, over five years ; and for the purpose of " showing that the cross-crimps give strength to the rub- " bing surface, preventing the ridges or ribs from break- " ing, as is the case in those without the cross-crimps ; and " also to show that even when one of the raised projections " are broken out by accident, as is the case in the said " Exhibit 'E. A. K.' 4, the board is not destroyed, but the

" cross-crimping prevents the break from extending along " the line of the ridge or rib."

Mrs. Janney (p. 69) has used the Todd board for upwards of six years, and has used also many other boards. She says:

Q. 1.—" How long have you had a 'Globe' board?

A.—" I have had it six years; I think it is six. " * * * It has been in use nearly every week " since I got it. I think Mr. Todd made it. * * * " It is as good as it ever was, as far as I can see."

Ellen McDermot (p. 70) says:

" I never used up one of these yet (complainants' " Exhibit B), I suppose I have had one over three years.

Q. 9.—" Where do the common boards wear or give " out in use?

A.—" Just the very same as that (complainants' E. " A. K. 3). Some of them give out pretty soon.

Q. 10.—" Did you ever wear out any of the common " boards?

A.—" Oh, yes; I have worn out a good many."

Anna Nessler (p. 70) testifies as follows:

Q. 7.—" About how long will the common boards " and the Globe boards last, if they are used about alike?

A.—" I think the Globe board will last a good deal " the longest. I have had mine now five years, and it is " just as good as new. The old-fashioned one would not " have lasted more than eighteen months.

Q. 8.—" How do the old-fashioned ones give out or " wear out?

A.—" As in these boards (referring to Exhibits 'E. A. K.' 1, 2 and 3, Almon Hall, notary public)."

Milward (p. 49) testifies as follows:

"The cross crimps have the effect of breaking up "the continuity of the lines formed by the crowns of the "original crimps, and in operation the surfaces most "prominent will be worn through first, and in boards "crimped in two directions the metal may be worn "almost entirely through on the prominent lines without "causing the plates to rip across. This materially affects "the life of the board, and is a matter of substance."

As to stiffening the zinc, see, also, Kitzmiller, page 4.

Appellee's witnesses also agree that one effect of cross crimping is to stiffen the zinc. (*See Powers, p. 14, cr. q. 64; Clark, p. 41, q. 7.*)

Washing Qualities.

There does not seem to be much room for doubt on this head. The continued growth in sale, with higher prices, is strong evidence of the fact that the board has improved qualities as a washer. The testimony is also very satisfactory on this point, when we look at the position or means of knowledge on the part of such of appellee's witnesses as have expressed contrary opinions. The appellants' witnesses are all, with one exception, persons skilled either in the manufacture or practical use of wash-boards, and they testify as follows:

Mrs. Janney (page 68):

Q. 5.—"Please say whether or not, in your opinion, "the Globe board is any improvement over the common "boards like Exhibit 2?

A.—"I think it is a great improvement. * * * "It washes easier—I think much easier; and I think it "does not wear the clothes out so much as the common "boards; and it washes *much quicker* than any other.

Q. 7.—" Do you think that the up and down grooves " and ridges have any effect for improving the board for " washing—and why?

A.—" I do; because it lets the clothes down into the " suds better, and lets the water out from under the " clothes; and cleans them quicker."

Mrs. Andrews (page 71) says:

" I can say that the Globe board does the work very " much easier and in less time than the old-fashioned " board, and the clothes seem to have been very much " better washed on the Globe board than on the other."

Ellen McDermot (page 69):

Q. 4.—" Please say which, in your opinion, is the best " washing board—the common board, defendant's Exhibit 2, or the Globe board, complainants' Exhibit B?

A.—" Oh, this is the one I have used—complainants' " Exhibit 'B.' * * * I can, in a day's work, be " two hours quicker."

Anna Nessler (page 70):

Q. 3.—" About how frequently have you had occa- " sion to use wash-boards: that is, how many days in the " week?

A.—" Sometimes five days in each week for the last " three years. * * I think I can wash two pieces " on the Globe while I could wash one on the old board."

Q. 6.—" Do you think the up and down lines on " the Globe board help any, or do any good in washing? " A.—Yes, I think so. I think that's what makes the " difference."

Ella M. Hamlin, p. 71:

Q. 5.—" How will the Globe board compare with " said Exhibit 13 for washing? A.—I would rather wash

" with the Globe board, because I think it washes better " and faster."

Milward, p. 47, says:

" Crimps crossed by other crimps are adapted to give " a very effective rubbing surface in washing, by reason of " the multiplicity of angles, and free escape, by reason of " the cross grooves, for the dirty water."

Appellee's witness, Upham, p. 32, Q. 9 and 10½, thinks that the cross crimping somewhat improves the washing face of the board.

Of the appellee's witnesses who think that cross crimping, or cutting across the main or transverse ridges, does not improve the washing qualities of the board, a slight examination of the records will show that they do not know whereof they assert, and that all of their opinions in this regard are mere guess-work.

Powers, p. 84, when asked if he knew how these boards were made, says that he has had it explained to him. When asked whether the cross crimping would not stiffen appellee's board as much as appellants' answers: "Yes, *probably* much the same;" and p. 84, Cr. Q. 73, says that he has never had any practical experience either in manufacturing or using wash-boards.

Fawcett is a mechanic. It does not appear that he ever saw a wash-board until he saw the exhibits in this case, and he thinks, p. 23, that the short way to make the common zinc boards is to stamp them between two corrugated surfaces—an absolutely impossible way of making them, except by stamping two rows at a time, which, instead of being a short way, is about eight times longer than crimping. It is evident from this answer (14) that he knows nothing of sheet metal working or of wash-boards.

Cavert is a machinist, and has seen the common wash-boards. He thinks the cross-crimping an actual damage; which, taken with the fact that it negatively appears that he never tried any board, shows that he knows nothing about them.

Gould is a mechanic, a joiner and model-maker; says that he made some experiments in crimping zinc in the winter of 1875–6, but not sufficient to tell whether the Galusha & Safford board could be crimped or not.

Tracy makes agricultural implements, and thinks cross-crimping a damage to the washing qualities of the board. On p. 38 he admits that he had no practical experience with wash-boards, and that he never read the appellants' patent.

Clark is a watchmaker, and it does not appear that he ever saw a wash-board until he was called as a witness.

Hull, the president of the appellee's company, does not see any good in cross-crimping; but the fact that he uses it, and fights for it, ought to be good evidence that it has some value. "Imitation is the sincerest form of flattery."

Attention is again called to the fact that, of all the witnesses called by the appellee, *Hull is the only one that knows anything about wash-boards, or ever had anything to do with them;* while every witness, except Milward, called by the appellants, is either skilled in their manufacture or in their use.

Longitudinal and Transverse.

The appellee has been at great pains in getting witnesses to swear that the Todd board had no longitudinal grooves or corrugations. Why the attempt should be

made to prove that there are no technical grooves in the appellants' board, is a mystery, as these grooves are twice mentioned in the patent as "*grooves*, or *depressions*," and once as "corrugations and depressions." Attention is called to the appellee's curious way of getting at such evidence. Appellants introduced their patent, and a board (Exhibit B) made in *exact accordance therewith*, for, on reference to Fig. 2 of the drawing, it will be seen that the depressions in the ridges, and the projections in the channels, pass each other by just the thickness of the metal. Appellee finds a Todd board where the cross-crimping does not meet, introduce that as appellee's Exhibit 1, ignore the patent and Exhibit B, and swear by Exhibit 1; and this is the only way by which it is made to appear that the cross-crimps are depressions and not grooves. By the patent and Exhibit B they are rather more grooves than depressions; and, by Exhibit 1, they are rather more depressions than grooves; but, either way, both are within the exact language of the patent, and Powers and Tracy both agree that the calling of them grooves, even in Exhibit 1, is not bad use of that word.

Infringement.

We now come to the consideration of the question of infringement. This question, as it seems to us, does not present serious difficulties, because the differences are in appearance and are not of substance. Appellee claims to be working under Hull's patent, but a comparison between this patent and the board made will, show that the claim is not valid.

Hull's Patent.

Hull, the president of the pump company, obtained a patent for certain alleged improvements in wash-boards Dec. 28, 1875, upon an application filed the 3d of the same month, which said patent the company claims to have the right to use. Hull (page 21) says that the pump company is manufacturing under an agreement with him, but neither Hull nor any other witness testifies that the company makes boards *like that shown in the Hull patent*, and it is contended, first, that the appellee's board is not like the one shown in Hull's patent; second, that the appellee's board is a literal copy of one form of the Todd board, as put on the market by the appellants; and, third, that in so far as the appellees vary from the right lines shown in the Todd drawing, they adopt a poorer form instead of an improvement. This third point is only mentioned here for the reason that several of appellee's witnesses have, contrary to the facts, asserted that its board was so far superior to the Todd as to entitle it to the rank as an improvement thereon. Hull (page 20) admits that an angle of 45 degrees would destroy the board; all approaches to that angle, therefore, would be more or less injurious, according to the incline.

1st. That the appellees do not follow Hull's patent is evident from a comparison of their board, Exhibit "C," with the patent. Hull refers to his drawing as a part of his description, and says: "Figure 1 is a front view of "*a washboard*, embodying my invention;" that his invention "consists in providing the sheet metal with "diamond-shaped projections, *each bounded by diagonal* "*grooves or depressions.*" His description is: "Each

" projection, B, is bounded by a diagonal groove or de-
" pression, *b*, as shown *particularly* in fig. 1." His claim is for " *a washboard* of sheet metal, formed with a series " of raised diamond-shaped projections, B, and a series of " *narrow* diagonal *grooves*, *b*, *between* the projections " which cross each other, substantially as set forth." Hull's drawing shows the " narrow " grooves, as " particularly " shown at fig. 1, to be *both equally deep, clear and distinct*, and of a sufficient width to form channels. Appellee's board has no such equal, narrow grooves, but it has the Todd main ridges and slighter cross grooves or depressions. Hull's drawing shows the projections to be equal on both of the upper lines, and each one to be perfect and complete in itself, and independent of the others. Appellee's board has projections having only one strong or full face, and the other lines shading off, *just like the Todd*. Hull's drawing shows a wash-board with *three and one-half projections reaching across the board*. Appellants' board has the numerous fine projections of the Todd board. Appellee has literally followed Todd's description of his board : " The rubbing face somewhat resembles the face of a rasp or file." Hull's patent shows a wash-board having twenty-seven full projections, and eighteen half-projections, equal in all to thirty-six projections. Appellants' patent shows two hundred and twenty-one projections, so that, by the patents, one of Hull's projections is equal to more than six of Todd's. Todd does not say that his drawing represents a full-sized board ; *Hull does*. Appellee's board, instead of having projections each one equal to six of Todd's, has, by actual count, 840, *just like the complete Todd*. The count of projections shows the Todd drawing to be one-quarter size ; allowing the same to Hull's drawing, there should

be only 137 projections to make a Hull board, instead of 840. By the same ratio, the Todd projections should be three-eighths of an inch each way, and we find them so on the board. Hull's should be two inches one way, by one inch the other way, but in appellee's board they cover *just the same area as the Todd*, or *six* in the place of *one* of Hull's.

Hull's drawing has the appearance of a landscape with ditches, which is due to the great size and flat form of his diamonds.

From this it would seem that the omission by the appellee to ask any witness whether appellants' boards were like the Hull board or patent *was not wholly accidental;* that the absence of proof that the appellee ever made a Hull board was a matter of necessity, and to justify the conclusion that the setting up the Hull patent is a pretext for their piracy of the Todd invention.

The law on the subjects of such variations is laid down by Judge McKENNAN, as follows:

An inventor is supposed to describe in his patent the best mode of practicing his invention, but is not necessarily limited to the *precise* construction shown, so as to exclude a method differing from it only in a single detail, but producing the same result.

Lorillard et al. v. *McDowell et al.*, 11 Official Gazette, p. 640.

This familiar law is laid down in the elementary books; and it is well understood that a patentee is only bound to describe what he considers his best method or device.

2d. That the appellee's board is a copy of one form of the appellants' board, appears from the following testimony:

Lyttle, pp. 72 and 73, testifies as follows:

"*All styles of double or cross crimps were included in* "*the royalty account, and paid for.* * * *

"They did manufacture boards at varying angles, "some like Exhibit 'E,' and others at a less angle. The "most of the early ones were like 'E.' They were not all "at the same angle as Exhibit 'E;' the angle was less. "The boards of varying angles were first made in the "summer of 1872. I should say there were from 30 to 50 "dozen made,—I could not say exactly—and they were "mixed in with the bundles of the regular Globe boards, "and *sent out to customers on orders for Globe wash-* "*boards.* * * *

"Some of the original make of boards were similar to "this (complainants' F. M. 3). The principal number we "have made like this (complainants' Exhibit F. M. 3), "were manufactured and sold in the years 1876 and 1877, "and were all included in the royalty account. * * *

"Some of these boards, similar to this (complainants' "Exhibit F. M. 3), were made each of those years (1873, "1874, 1875). There might not have been any made in "1875, as I was out on the road traveling at the time; "but in 1873–4, I am positive there were. *In the fall of* "*1873, we talked of applying for a patent on the design* "*similar to complainants' Exhibit F. M. 3, but, after con-* "*sultation and consideration, we were satisfied it was* "*covered by the Todd patent, and did not do so.*"

Hamlin, pp. 65 and 66, testifies as follows:

"I have varied them (the Todd boards) to almost "every angle. The variations were made by running the "zinc through the crimping rollers at different angles. "These were made in the fall of 1872. They were made

" for sale on the market, and to try which was the best " way of crimping the zinc. * * *

" *I understood it to be the same board, only in a differ-* " *ent form.*

Q. 17.—" Please look at the board, complainants " Exhibit 'C,' and say whether or not in varying the angles " you made any like that; if you answer yes, state when " the first one was made?

A.—" I think there is a little difference in the crimp, " this being a little finer than ours. I think, no doubt, " though, I made some at the same angle, that is, in the " fall of 1872.

Q. 21.—" Please look at the boards marked Exhibits " 'F. M.' 1 and 2, and say whether or not you know how " they are made?

A.—" Yes, I know how they are made. * * *

" The same machinery and process were used for " both. The only variation was the angle of the crimp. " All these boards were made in the same machinery."

Herzig, pp. 60 and 61, testifies as follows:

"*I have made boards, under the Todd patent, with* " *the crimps at other than right angles.* I couldn't de- " scribe the angles. Mr. Warren told me to go to work " and run some, and *I made them at all sorts of angles.* " We did this to find out whether the cross crimps made " that way would make a better washer than when the " crimps crossed at right angles. I run these boards " either in the spring of 1875, or the winter previous."

Referring to Exhibit " C," he says:

" I think I made boards of that angle. I made " boards of different angles, of all kinds, and must have " hit that one. This was in the spring of 1875, or " previously." * * *

" *I claim that they are all the same board, only in different forms.*"

Bischoff, p. 64, testifies as follows:

Q. 15.—" Please state what difference in machinery, or " process, if any, was used in the manufacture of these " boards, 'F. M.' 1 and 2, and that of the Todd or 'Globe' " board?

A.—The same machinery was used, the angle being " the only difference.

Q. 16—" In your judgment, are the boards Exhibits " 'F. M.' 1 and 2, and 'C,' the same as or different from the " Todd board, or complainants' Exhibit 'B.' In answer " please give your reasons?

A.—" *I should say they are all one kind.* The reason " I give, it is because they are all cross-crimped. The " zinc is only turned at a different angle. *The difference* " *is all in appearance to the eye.*"

Cavert, appellee's witness, p. 92, C.-Q. 5, testifies as follows:

" Then without reference to the direction of the lines " of crimping, is not the zinc portion of the boards 1 and " C simply the difference between the adjustment of the " rollers while the zinc was passing through them?"

A.—" Yes, sir."

From the evidence quoted, it appears that the appellants have made and sold boards like the appellee's board for the last five years, three years before Hull's application for a patent; that more than two years prior to said application, they canvassed the propriety of getting a design patent for it, and did not do so for the reason that they were advised and believed that it was a Todd board. That royalties have been paid for the same board as that of the appellee's to the owners of the

Todd patent for the last five years, and that if the pump company's board is a Hull board, then that Hull's patent is void.

There is no claim for the machines by which the boards are made. What tools are used in manufacturing them is of no more importance than would have been the inquiry as to whether Whitney made his cottin gin by using the common jack-planes, saws, and hammers.

"By their fruits ye shall know them" is as true and correct a rule for determining the existence and value of inventions, as it is for determining individual character.

The Exhibits 'E. A. K.,' 1, 2 and 3 show the weakness and defects of the old zinc boards. The fruits produced by cross crimping are: 1st, a stiffening of the zinc; 2nd, stopping the tendency of cracks to follow the crimping lines; 3d, nearly doubling the number of washing lines in the same space or area; 4th, breaking the crimping lines into short sections, so that ridges which would otherwise be too fine to do good service, become effective; 5th, prolonging the life of the board; 6th, saving time in washing; 7th, doing better work; 8th, saving wear on the clothing; and 9th, making much lighter the heaviest and most wearying of household labors.

These are the fruits of Todd's invention, and we think we may safely challenge any one to produce an invention in so old an art, or in so small and simple a device, that has so many points of excellence in improved results.

As before stated, the novelty of the invention is hardly attacked by the appellee, and the array of exhibits only shows how many recognized the fact that improvements were desired, and how many failed. The array is an exhibition of old wrecks that were never

launched, or that were immediately stranded on the shores of time.

Appellants' board is made exactly the same way as the Todd. There is no dispute as to this, and the thorough overhauling of the art by the appellee leaves it clear that Todd was the first that ever made a cross or double grooved wash-board, and from the exhibition of the older art we find that Todd did not use any previously patented inventions in his board; that he took the common board, and made its ridges finer—so fine that this would be useless for a single crimped board—then cross grooved it so as to restore by such cross grooving the roughness lost in the first fine ridging, and thereby increased the washing face largely without increasing dimensions, and that in so doing he diminished the number of times of travel over the distance in order to complete the washing, saving from two to four hours on a day's work.

The claim made by some of the appellee's witnesses, that its board presents more rubbing surface than the Todd board, is simply absurd. It is a mathematical fallacy, for it must require less force and cause less friction to pass a projection on an incline than to meet and pass squarely over it.

An inspection of the appellee's board shows that it has a main line of corrugations or ridges, and a subsidiary line, and that it is not true that two sides of each projection act equally in appellee's board when in use. If it was possible to make a board like Hull's picture, then it might be true; but as the board is actually made it cannot be, and this class of testimony only goes to further show how little these witnesses knew about wash-boards, and how carelessly they formed their opinions. All of their statements are given as opinions and not as facts.

Milward, p. 48, states the matter as follows:

"The question of rubbing surface is one effected by the "angle of presentation of the rubbing surface to the direc- "tion of the motion of the hands of the operator, so that it "can be easily seen that one surface, although less in "length than another, may be equally effective. In the "character of rubbing surface presented in the two exhibits "referred to in the question, the fairest way of computing "the rubbing surface is by counting the prominences in "each, and the one having the greatest number of promi- "nences will have the greatest amount of effective rub- "bing surface. In this case the number is the same "in each. It is of course best that the prominences "should present one side broadside to the direction of the "motion of the hand, and for this reason defendant's Ex- "hibit 1 would be more effective in operation than com- "plainants' Exhibit 'C.'"

Identity.

Much of the testimony on this head has already been quoted, and we therefore only quote the following excellent summary by Mr. Kitzmiller, p. 41:

"I have already given my reasons and to repeat them "in brief, I would say that I find the defendant's board "to be the same as that shown and described in complain- "ants' patent, because I find in such board a sheet metal "rubbing surface having a series of raised projections, "which are each bounded on all sides by grooves or de- "pressions made by cross-crimping in lines *which are* "*substantially longitudinal and transverse*, in reference "to each other, which is the substance of the first claim "of the patent Exhibit 'A.' I also find in the defendant's

"board, projections raised from below, connecting the "acting projections together, in one direction, as shown "in the patent Exhibit 'A,' so as to stiffen the board and "aid in keeping in place, or in other words to prevent the "zinc from moving so as to crack it when under pressure "in use. I find, further, that the combination of the "larger and smaller projections, referred to above, and "caused by cross crimping, make up the defendant's "board when placed in its frame-work, as shown by Ex- "hibit 'C,' and therefore conclude that they are substan- "tially one and the same thing for all purposes; or, in "other words, the boards Exhibits 'B' and 'C' are sub- "stantially the same for all purposes."

Appellee has taken considerable testimony on the appearances. It is an old maxim that appearances are deceitful, and as the Todd patent is not for a design, the appearance to the eye is wholly immaterial.

The law applicable to this case is laid down by this court in the following language, which, under the proofs in this case, is to the exact point:

"Undoubtedly, the results or consequences of a pro- "cess or manufacture may in some cases be regarded as "of importance when the inquiry is whether the process "or manufacture exhibits invention, thought, and ingenu- "ity. Webster, on the subject matter of patents, p. 30, "says: 'The utility of the change, as ascertained by its "consequences, is the real practical test of an invention; "and, since the one cannot exist without the other, the "existence of one may be presumed on proof of the ex- "istence of the other. Where the utility is proved to ex- "ist in any degree, a sufficiency of invention to support the "patent must be presumed.' We do not say the single fact "that a device has gone into general use, and has dis-

"placed other devices which had previously been em-
"ployed for analogous uses, establishes in all cases that
"the latter device involves a patentable invention. It may,
"however, always be considered; and, when the other
"facts in the case leave the question in doubt, it is suffi-
"cient to turn the scale."

Smith v. *G. D. Vulcanite Co.*, 3 Otto, p. 495.

Conclusions.

We have only to say, in concluding, that the brief and argument may appear to be unnecessarily long, but its length is occasioned partly by its being partly an abstract, rather than by comments of counsel.

Our conclusions are:

1st. That the court below was right in holding the Todd patent to be a valid patent.

2d. In holding that his improvements in the art were new and useful.

3d. In holding that Todd's patent stands clear from the older art; and,

4th. That it was wrong in holding that the appellee did not infringe.

WEST & BOND,

For Appellants.

Luther L Bond

Of Counsel.